

Directory of Estuarine Nearshore Marine Assessment Projects

Title	Orca Pass International Stewardship Area
Brief Description	<p>Orca Pass refers to our area of interest. This trans-boundary area was selected by using mapped physical characteristics, marine resources, and constituent interests to identify the borders of an ecological system in need of protection due to declining or endangered natural resources. The area of interest was also considered in meetings with government officials on both sides of the border to determine how this citizens' initiative could complement and enhance related efforts. On going governmental efforts include the Islands Trust/San Juan County marine protection initiative and the National Marine Conservation Area proposed by Parks Canada for southern Georgia Strait. The Orca Pass initiative is unique in its cross-border approach, and in the fact that it is a citizen-led effort. With more than twenty citizen-based organizations coming together to sponsor this project, it marks a departure from traditional mechanisms of resource management.</p> <p>Within this larger project we are trying to identify specific "core" sites for special protection that might allow the larger ecosystem to function despite ongoing human impacts. This portion of the project utilizes known species distributions, ecological information and appropriate algorithms to identify an efficient network of sites intended to protect those species identified as being at greatest risk. These "core" sites are likely candidates for designation as marine protected areas, marine reserves, marine parks or protection using other tools, while we hope to encourage enhanced environmental stewardship throughout our general area of interest. The critical, and in some ways unique, components of our approach are that it places habitats and natural resources on both sides of the boarder into a common framework. In this way, Orca Pass can be seen as a regional effort that is attempting to use an ecosystem approach for targeting conservation decisions rather than basing them on single species management goals or politically relevant but biologically meaningless geographic constraints.</p>
Objectives	<p>There are two primary drivers:</p> <p>a) Despite the political boundary, the "trans-boundary" waters between BC and Washington State really make up a single ecosystem. They're home to the same marine creatures - from Orca whales to oystercatchers - and are affected by the same types and sources of pollutants and habitat and population disruptions.</p> <p>b) This effort was prompted due to several alarming reports of steep declines in populations of multiple marine species. Prominent among those species that led to this project are the southern resident Orca whales which are currently being petitioned for ESA listing, seven Puget Sound fish species that were recently reviewed for listing under the U.S. Endangered Species Act. Also of concern are a suite of birds, marine mammals and habitats that are considered to be in steep decline and are listed as "priority," endangered or threatened by Washington State and British Columbia.</p>
Geographic Scope	<p>The site identification is taking place throughout our area of interest, which is defined in the following image. This area is bordered on the south by the northern and western edge of the San Juan Archipelago (including the north shores of Orcas and San Juan Islands, and the western shores San Juan and portions of Lopez Island). The area extends north through the southern Gulf Islands (to the southern edge of Galliano Island) in the north, and includes portions of the Saanich Peninsula to the West. The specific results of this project are discrete locations identified in this area of interest and those results are not applicable soundwide.</p> <p>However, the methodology and criteria used for identifying and selecting sites for protection and for promulgating appropriate management are. We are using an</p>

	<p>algorithm developed by Hugh Possingham and Ian Ball to place habitat and species occurrence data into a common framework for making decisions about how to most efficiently protect species groups of interest. This framework allows us to set species and habitat specific representation goals and enables us to define what represents “viable (or sustainable) occurrences.” More information about this tool and its uses is available at: http://www.biogeog.ucsb.edu/projects/tnc/overview.html</p>
Subdivisions	<p>Our study area is not being subdivided because we believe we have captured a functional unit that should be considered as a whole despite its crossing an international border. Our analysis differentiates, at its finest scale, sites at a 25 hectare resolution (500X500 meter grid across our area of interest/study area). We are currently exploring the use of larger resolution analyses to capture wide ranging species and habitats that depend on conditions and spatial arrangements not captured in 25 hectare planning units.</p>
Variables	<p>The primary variables being addressed are species occurrence as identified through surveys and expert consultation; species life stage information as identified through surveys; and habitat as identified in either the nearshore (shoreline data taken from Shorezone) or marine environment (developed using bathymetry and other data sources).</p> <p>Our analysis currently uses historic information only for the purpose of identifying species representation goals in our project. These goals are developed using expert consultation and reports such as Geographical Distribution of Puget Sound Fishes: Maps and Data Source Sheets (Miller and Borton 1980).</p>
Data sources	<p>In the U.S. Species data were collected from PSAMP, WDFW, the Natural Heritage program and the Whale museum. Much of this data is widely available while some was developed with partners from consultation with individual species managers.</p> <p>Habitat data was developed primarily using WDNR’s Shorezone data set and bathymetry data collected from WDFW.</p> <p>Some species and habitat data was developed through expert interviews and through expert workshops where resource managers and scientists from throughout the state were brought together to discuss data with a particular focus on this project.</p> <p>In Canada Species data was collected from federal and provincial agencies including LUCO for data that is publicly available. Some species data was collected from expert workshop and from Canadian partner organizations that collected data through their own workshops.</p>
Products	<p>Products include a discrete map describing the results of our analyses that shows sites picked using our methods to achieve targeted goals for sustaining species and habitats of interest. This map will be integrated into a brief report (10-20 pages) describing the overall methods, findings and proposed actions. Information about this study will be available through our web presence (www.pugetsound.org).</p> <p>Products will be produced for three target audiences, including: 1) scientists and resource stewards; 2) targeted public constituencies who might encourage protection of marine resources and 3) the general public and decision makers.</p>
Timelines	<p>Project initiated in late 1999. We have identified some preliminary sites within the area of interest that we are researching further to examine their suitability for protection. The overall methodology for identifying sites is continuing to be revised as we include more information about invertebrate species and habitat classification. We expect to have tentative results from this analysis in Fall 2001 and to produce detailed results and publications in early 2002.</p>
Funding	<p>So far this project has cost \$80,000.</p>

Names:

Funding Sources include: NAFEC-CEC, the David and Lucile Packard Foundation and the William and Flora Hewlett Foundation.

Primary actors include:

Kathy Fletcher, People for Puget Sound
Laurie McBride, Georgia Strait Alliance
Jacques White, People for Puget Sound
Howard Breen, Georgia Strait Alliance
Mike Sato, People for Puget Sound
Peter Ronald, Georgia Strait Alliance
Philip Bloch, People for Puget Sound
Kevin Ranker, Friends of the San Juans

The chorus of project supporters includes more than 20 non-profit organizations in Canada and in the U.S. and through consultation this project has included individuals from most resource agencies on both sides of the boarder, from First Nations and Tribes and from several universities in the area.

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Other Type:

Title	Puget Sound Naval Shipyard Project ENVVEST
Brief Description	The risk to ecological resources is being assessed at the watershed scale to develop and demonstrate an alternative strategy for protecting and improving the health of Sinclair and Dyes Inlets. Through an agreement among the Puget Sound Naval Shipyard, the Environmental Protection Agency, and the Washington State Department of Ecology, the ecorisk process is being used to provide a unifying framework to focus data gathering activities, develop and incorporate concerns of agencies, organizations, or individuals that have a stake in the management of the watershed (stakeholders), foster partnering among stakeholders, and establish the technical and scientific basis to better protect and improve the health of the Inlets. The effects of stressors released from industrial and stormwater discharges, sewage treatment plants, and runoff from the surrounding watershed are being assessed by evaluating historical data, conducting studies to evaluate stressor sources and effects, and developing fate and transport models.
Objectives	The assessment will define the ecological state of the Inlets and surrounding watersheds, establish a link between stakeholder values and assessment criteria defining management endpoints, and develop a vision for the ecological health of the Inlets. Results from the assessment will help in addressing agency concerns and provide data to develop total maximum daily loading for priority constituents.
Geographic Scope	Sinclair and Dyes Inlets and contributing watersheds. Outcomes are applicable soundwide.
Subdivisions	The scale varies according to the analysis tasks. Estuarine areas include, shorelands, Intertidal and Subtidal; Watershed includes, terrestrial, riverine, and urban areas.
Variables	Environmental conditions within the system including biological and abiotic factors
Data sources	Both historic and new data will be used
Products	Peer-reviewed publications, website, project documentation
Timelines	Technical Masterplan is being finalized. Project started Sept 2000, Phase I completed Sept 2003, phase II complete 2005 (estimated)
Funding	US Navy; Puget Sound Naval Shipyard and Navy Region Northwest are resource sponsors.
Names:	Project Management Team Gerald Sherrell, PSNS sherrellg@psns.navy.mil Tom Eaton, EPA eaton.thomas@epa.gov Kevin Fitzpatrick, Ecology, kfit461@ecy.wa.gov

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Other Type:

Title	Oakland Bay & Hammersley Inlet Nearshore Inventory
Brief Description	Mapping the historical and current physical and biological features of the study area using existing information and new data and develop scientific criteria for identifying areas that are degraded, minimally impaired and properly functioning. Also establish data collection sites to identify trends.
Objectives	(1) Design and implment a protocol for inventorying nearshore habitat in the project are (2) Identify properly functioning and degraded areas for prioritization for preservation and restoration, respectively.
Geographic Scope	Shoreline of Hammersley Inlet & Oakland Bay -- 12 miles of shoreline, directly adjacent to 8 major drainages
Subdivisions	Study area will be divided between the two inlets, each inlet is divided into "drift cells" and within each drift cell we will be focusing data collection on habitat features such as sand or gravel beaches, mud flats and stream mouth/estuarine habitat.
Variables	Earliest available maps
Data sources	Using WDFW, DOE existing research and information.
Products	A final written report will be produced including maps. An electronic copy of the report will be available, ARC export GIS files with data layers will be created for the project. Distribution of the report is undetermined at this time but will be available for wide distribution and hope to have a State or SRFB web site to archive information.
Timelines	Start date @ April 2001 end date October 2001.
Funding	Funding source (\$55000 SRFB) @ \$10000 in kind support Squaxin Island Tribe Total cost is \$64,900 -- 85% from SRFB; 15% from locally donated equipment & labor.
Names:	Squaxin Island Tribe / Natural Resources Taylor Shellfish / Diane Cooper
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Title	Snohomish Estuary Wetland Integration Plan (SEWIP)
Brief Description	<p>The overall goal of the Salmon Overlay was to analyze the functions of habitat that are particular importance for chinook, coho and bull trout and to develop a salmon habitat assessment model that provides a basis for management of estuarine resources to enhance salmon recovery. Three parallel activities were pursued:</p> <ol style="list-style-type: none"> 1., Develop a scientifically valid tidal habitat model (THM) that is applicable to listed species and establish the protectiveness of the model implementation policies to salmon. 2., Use of the model to rate the quality of tidal habitats in the Snohomish Estuary and adjacent marine nearshore areas to provide a semi-quantitative measure of present salmon habitat quality and availability. 3., Use the model to assess the restoration potential of various actions at various sites throughout the estuary. 4., Clarify of the overall place of the SEWIP in the region's regulatory and ESA response framework. <p>Pentec and the City convened a technical committee of local, state and tribal biologists who met for a year to accomplish the model revisions and validate the underlying scientific basis for the model. The SEWIP model uses an indicator value assessment (IVA) approach to rate estuarine and nearshore areas for the quality of ecological functions provided to salmon (juvenile and adult). Presence of 34 indicators or factors contributing to these ecological functions is scored in the model and summed to provide a rating in IVA points/acre for each Assessment Unit (AU). When multiplied by the area in each AU, the resultant score is a measure of both area and quality of function provided. These scores (IVA-acres) were then summed to provide an index of the total habitat available in the planning area.</p> <p>The committee also evaluated alternative policies that would allow the model to be used in assessing compensatory mitigation requirements in a manner that would assure a net gain in habitat availability for listed species.</p> <p>Pentec biologists then conducted field surveys to rate and map the present quality of habitat in 132 Assessment Units within the study area for salmonids and compiled a quantitative measure of present salmon habitat quality available in the planning area. Nearshore and adjacent diked upland areas were also rated for their suitability for application of restoration/enhancement actions to improve on the existing habitat. These data were used to project the potential impact of various development and restoration scenarios to ensure that reasonable development within the urban growth area was compatible with estuary-wide restoration goals.</p>
Objectives	See Description above. The primary product of this project was the Salmon Overlay which is a blueprint for salmon habitat recovery in the Snohomish Estuary. This product has been adopted by the City of Everett as part of their revised Shoreline Management Plan and may become a part of a 4d rule governing allowable practices and establishing a realistic habitat recovery program for the estuary. As part of this Overlay, Pentec has prepared GIS maps depicting existing salmon habitat quality and restoration potential of areas throughout the estuary.
Geographic Scope	<p>Field evaluations using the model were initially run on about 80 miles of shoreline from the head of Ebey Slough, through all the distributary channels of the Snohomish estuary and out along marine shorelines to Mukilteo and the entrance to Tulalip Bay. A subsequent contract from the City of Mukilteo allow the model characterization to be extended south along the shoreline of Mukilteo to Picnic Point and we expect to gain authorization from the City of Edmonds to extend it south through Edmonds.</p> <p>The THM is fully applicable to all tidal shorelines in the State; the only reservation is that the model may not adequately characterize the function of natural rocky shorelines as habitat for juvenile salmonids – these functions have not been directly studied.</p>
Subdivisions	The study area was subdivided into 7 ecological management units (EMU) based on

	<p>historic and present ecological zones (e.g., tidal freshwater [formerly forested riverine tidal], emergent/forested transition, estuarine emergent marsh, industrialized river mouth delta platform, Port Gardner shoreline, etc.)</p> <p>The THM is intended to be used with Assessment Units of various scales. AU were distinguished as discrete ecological units separated by biologically meaningful boundaries. AU ranged in size from 1 to several hundred acres, depending on the uniformity of habitat.</p>
Variables	The THM can be applied to existing conditions, known past conditions (e.g., based on historic maps or photographs), or hypothetical future conditions (e.g., value of a diked agricultural field if a channel is excavated, dikes breached, and a saltmarsh fringe established). Any known conditions can be modeled.
Data sources	Existing aerial photography (e.g., Ecology shoreline oblique series) is very helpful for initial AU delineation and for areal coverage indicators. Remaining data required can be obtained by a field visit during a low tide. Varying levels of detail can be incorporated into the model for indicators that receive a different score depending on
Products	<p>The Salmon Overlay includes the following maps, by AU:</p> <ul style="list-style-type: none"> • IVA scores, • Presence of stressors, • Presence of important habitat features (eelgrass beds, marshes, tidal channels, fecal bluffs) • Restoration opportunities and habitat function provided by improved access or removal of log raft storage • Restoration opportunities (prioritized) and habitat function provided by tidal restoration
Timelines	Project is complete. Report is available.
Funding	Project was jointly funded by 2496 money, a NOAA CZM grant, and the City of Everett, and the Port of Everett. Cost of model development and policy negotiations was about \$120k; Field work and model application was about \$45k. Mukilteo shoreline (5 miles) was mapped and scored for about \$2k.
Names:	Technical lead is Jon Houghton, Pentec Environmental (425) 775-4682. City of Everett Contracting officer and policy lead is Paul Roberts, Planning Director, (425) 257-8731.
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Title	Bainbridge Island Nearshore Assessment
Brief Description	The scope of the project will be drafted during the next several weeks, but the gist of the assessment is to develop qualitative analysis to support a programmatic habitat protection and restoration strategy (i.e. regulations & BMP's). The assessment will 1) collect baseline information on nearshore habitat and structure, 2) quantify impacts created or otherwise influenced by man-made structures or alterations in the nearshore on the controlling factors of the nearshore ecosystem, 3) develop criteria for ranking/prioritizing habitat restoration and protection, and 4) identify restoration projects. This analysis will be tied to biological assemblages and coastal processes.
Objectives	<ul style="list-style-type: none"> Identify opportunities for habitat preservation and restoration and strategically prioritize the opportunities. Develop baseline information needed for monitoring the success of future preservation and restoration efforts Use baseline information and impact analysis to develop criteria for habitat priority/likelihood to restore <p>Drivers include land use policy development and modification for nearshore ecology conservation (including salmonids) and ESA approval under Section 7 or 4(d) limit 12.</p>
Geographic Scope	Bainbridge Island -- 45 miles of shoreline and 8 estuaries
Subdivisions	Tidal inlets and open coastline will be separated into sub-populations. Beyond this, the study is undefined currently.
Variables	Not yet defined. Not sure if it will be historic yet, or how far back.
Data sources	Both developed through the project and already available -- but not yet defined.
Products	Format undefined. Audience: local jurisdictions, citizens, others undefined.
Timelines	Starting 4/1/2001. Ending 12/30/2002. Schedule is highly desired but open to necessary flexibility.
Funding	Total Cost is \$95,000 -- 85% from SRFB and 15% from local appropriation Note: funding increases expected from SRFB and city match.
Names:	Project Manager: Marti Stave, Senior Planner – City of Bainbridge Island Project Assistant: Peter Namtvedt Best, Planning Intern – City of Bainbridge Island Consultants (Note: not formally contracted yet): Applied Environmental Services, Inc. Myers Biodynamics, Inc. Anchor Environmental, L.L.C.
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Title	Shoreline habitats of HC & eastern SJdF
Brief Description	High-resolution spatial assessment of shoreline habitats of Hood Canal and eastern Strait of Juan de Fuca using high spatial resolution hyperspectral (CASI) imagery with an emphasis on the landscape structure of eelgrass (<i>Zostera marina</i>) habitat for summer chum salmon (<i>Oncorhynchus keta</i>).
Objectives	The goals of this project are to (1) create a high-spatial resolution (approximately 1.5 m pixels) map of estuarine habitat types, including eelgrass beds and (2) relate patterns in eelgrass bed structure to patterns in shoreline development.
Geographic Scope	Hyperspectral data (700 m wide Flightlines of varying lengths) were collected along most of the Hood Canal and eastern Strait of Juan de Fuca shorelines centered on the low water line. River mouths were excluded. Results are applicable throughout Hood Canal and the eastern Strait, but do not include embayments or river mouth deltas.
Subdivisions	In 1999 and 2000, we collected hyperspectral data for much of the Hood Canal and eastern Strait shoreline. Initial image processing and data analysis are focusing on three areas in Hood Canal. Plans are to address additional shoreline areas late in 2001. Hyperspectral data were collected for most of the Hood Canal and eastern Strait shoreline. Analysis will occur in 100-150 m shoreline blocks within drift cells. Imagery was collected at 1.5 m spatial resolution. Minimal map unit areas will be on the order of 40 m ² .
Variables	We addressed current areas and locations of near shore habitat types and of shoreline developments.
Data sources	GIS coverages of hyperspectral flightlines, GPS control points, ground-based radiometric measurements, and digital orthoquads (DOQ).
Products	Nineteen-band hyperspectral imagery Shoreline habitat training site data, including visual and digital photo-based estimates of habitat cover Classified imagery depicting near shore habitats of Hood Canal (GIS Format) GIS coverages of shoreline modification inventory Narrative report that describes patterns in shoreline habitats and the relationship between eelgrass habitat structure and shoreline development
Timelines	Phase I - 1999 Phase II - May 2000-April 2001 Phase III - May 2001 - 2003
Funding	Point No Point Treaty Council has obtained funding through the Bureau of Indian Affairs
Names:	Chris Weller, Biologist, and Alan Mortimer, GIS Analyst, Point No Point Treaty Council, Kingston, WA Charles 'Si' Simenstad, Wetland Ecosystem Team, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA Ralph J. Garono, Wetland & Watershed Assessment Group, Earth Design Consultants Inc. Corvallis, OR Ron Hirschi, Habitat Consultant, Hadlock, WA Ted Labbe, Habitat Biologist, Port Gamble S'Klallam Tribe, Kingston, WA Herb Ribley, HDI, Dartmouth, NS, Canada ECOTRUST, Portland, OR
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Title	Skagit Nearshore Habitat Inventory
Brief Description	1. Examine the relationship between natural coastal processes and human caused shoreline modification which result in the current conditions of nearshore habitat in Skagit Bay. 2. Examine the biological linkages correlated with specific nearshore habitat types and juvenile chinook salmon production. 3. Use these results to propose specific actions that protect sensitive nearshore habitat areas from degradation and restore important degraded nearshore habitat areas to increase juvenile chinook salmon production.
Objectives	Understanding chinook limiting factors and propose specific projects to protect and restore habitat
Geographic Scope	Skagit Bay -- approximately 57 shoreline miles
Subdivisions	Phase I will identify areas of similar characteristics based on the habitat combinations of vegetation, substrate, and energy. Phase II will collect information from a sampling of these "habitat combinations."
Variables	<p>Phase I: generalized intertidal vegetation (polygon data), generalized intertidal substrate (polygon data), degree of wave energy exposure (polygon data), and backshore substrate type (arc data); upland disturbances (grading, road building, excavation, etc) in the areas immediately above the shoreline); shoreline disturbances (armoring, bulkheads, boat ramps, major driftwood removal, docks, etc), intertidal disturbances (boat ramps, channelization, non-native vegetation changes)</p> <p>Phase II: Water current (direction, velocity, duration) at various tidal stages; water temperature, correlated with temporal and tidal conditions; salinity, correlated with tidal stage; usage patterns and abundance of juvenile salmon; usage patterns of juvenile forage fish and potential salmon predators; changes or persistence of general habitat characteristics (vegetation and substrate)</p>
Data sources	DNR intertidal habitat inventory 1996 and data collected through this project
Products	<p>Phase I: Report The summarizing inventory results and including maps of nearshore habitat conditions and disturbances for Skagit Bay. All physical data collected in Phase I will be incorporated into GIS Themes as either arcs or polygons.</p> <p>Phase II: baseline database of physical and biological characteristics for each control and test site. This would include the characteristics identified in the DNR database and beach seine sampling of the fish assemblages at each site.</p>
Timelines	Ongoing. Phase II baseline data collection occurs in 2001 from February to October (the period of juvenile chinook presence).
Funding	Seattle City Light, Tribal research funding
Names:	Eric Beamer (360/466-7241) and Aundrea Noffke (360/466-4691), Skagit System Cooperative, Research Program, PO Box 368 La Conner Washington 98257
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Title	Regional Risk Assessment for Cherry Point
Brief Description	Three phases: 1. Herring (June to October 2000) 2. Identifying alternative resident species (October 2000 to April 2001) 3. Performing risk assessment for alternative species (tentative pending funding: June 2001 to June 2002)
Objectives	<p>The objective of the first phase was to retain a focus on herring as the species of interest, but rather than concentrating on the potential risks associated with a particular facility (as the Screening Level Ecological Risk Assessment did with the ARCO pier extension) to look at the risks to the species of interest on a regional scale.</p> <p>The objectives of the second phase are to identify resident species (since herring are present only part of the year, they may not be a good indicator species to assess impacts on organisms that spend most or all of their life cycle at Cherry Point, and to revise the results of the first phase based on additional information that has been collected.</p> <p>The objective of the third phase will be to develop and test risk hypotheses for the resident species.</p> <p>The driver is DNR's need to start managing aquatic resources on a regional, rather than a case-by-case, project-by-project basis. We think we will have a better chance of effectively managing state resources and contributing to the protection of endangered species if we start working on a regional basis.</p>
Geographic Scope	<p>Geographic scope of the current project includes the following areas, split up into "risk regions:" Alden Bank, Semiahmoo-Birch Pt.-N. Birch Bay, S. Birch Bay-Pt. Whitehorn-Cherry Point, Cherry Point-Sandy Point-N. Lummi Bay, S. Lummi Bay-Hale Passage, F. Roberts</p> <p>One of the goals is to build staff expertise so that we can apply the regional risk assessment methodology to other areas of the Sound as the need and opportunity arise.</p>
Subdivisions	See list of areas above
Variables	The method involves identifying sources (location of potential stressors), habitat (location of potential receptors) and impacts (location of potential effects) on the organisms of concern, applying ranking and weighting factors to enable comparison of different kinds of risk, and developing testable hypotheses.
Data sources	Contractors are reviewing a lot of existing literature and drawing heavily on data from DFW. We anticipate generating some new data to fill gaps in the literature record.
Products	Products will include/have included: formal written reports to DNR, presentations to DNR staff, management, Cherry Point Technical Workgroup, PSRC audience.
Timelines	The first phase was completed October 13, 2000 as scheduled. The second phase will be substantively complete by June 30, 2001. The timeline for the third phase will be determined in part by the amount of funding available, which won't be known until the end of the Legislative session. We would like to complete the third phase in 12 – 18 months (Jun – Dec. 2002) after funding levels are identified.
Funding	Phase 1 and 2 funded by internal DNR funds and by in-kind contribution from the investigators. Phase 3 would be funded via a request in the 2001-03 biennial budget.
Names:	Dr. Wayne Landis, Ms. April Markiewicz, Ms. Emily Hart-Hayes – Western Washington University, Dr. Bruce Duncan, US EPA Region X.
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Title	Estuarine Health Indicator
Brief Description	Developing and applying indicators that will characterize the current conditions of estuarine and nearshore habitats.
Objectives	As part of implementing the State Salmon Recovery Strategy, the Joint Natural Resources Cabinet has developed a salmon recovery scorecard. The scorecard is composed of indicators that will let the state and the public track progress on salmon recovery.
Geographic Scope	Sound-wide
Subdivisions	Not yet determined.
Variables	Not yet determined. Possibilities include: water quality, water quantity, sediment quality, exotic species, [riparian zone, channel migration zone and flood plain connectivity, intertidal and shallow subtidal habitats (historic vs current)], shoreline armoring
Data sources	Not yet determined.
Products	A rating system that will evaluate estuarine habitat conditions.
Timelines	Not yet determined.
Funding	Base PSAT funding.
Names:	Jo Henry, PSAT

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Other Type:

Title	Rapid Shoreline Inventory (P4PS program)
Brief Description	The Rapid Shoreline Inventory recruits, trains and deploys a team of volunteers to gather data on a select set of shoreline at an extreme low tide. This data (mostly physical) is taken on 150-foot sections of beach, thereby providing a look at the beach that is much more detailed than ShoreZone. The data looks at both the nearshore and adjacent upland -- we know of no other system that does -- and can be used to target areas for conservation and/or restoration.
Objectives	In general, the object is to discover relations between adjacent land use and the health of the nearshore. In specific, the goal is to identify areas as high priority for conservation and/or restoration.
Geographic Scope	We are working Sound-wide, but not restricted from working with partners in BC. As the data base grows, it will get more interesting Sound-wide, both in terms of the geography covered and in terms of having enough data with which to draw larger conclusions.
Subdivisions	<p>We are using other data sets to target our more geographically specific data gathering based on 150-foot sections of beach (about the size of a house lot). A typical survey this year is five to eight miles.</p> <p>The analysis that does the targeting will be conducted for all of Puget Sound. We are hoping to develop this into a multivariate statistical model.</p> <p>The spatial resolution of the analysis is 1 to 12,000.</p>
Variables	Data form to be provided
Data sources	We use all available large georeferenced data sources, mostly shorezone, other DNR like eelgrass and bull kelp, and several WDFW like forage fish spawning & herring holding. Plus, of course, those developed through the project.
Products	<p>We produce sample maps that display data x or data y with an elevation map in the background (we provide these to the local jurisdiction and funder). We're currently working on a new web display. The data is available to the public.</p> <p>The audience is broad, from local, state and federal agencies to activists to academics.</p>
Timelines	<p>The timing is dependent on daytime low tides, which generally means five to ten days a month from May to August. The time line is also dependent on the length of the survey. Even a one-mile survey should take at least five months, though quicker is possible if there's a good reason. Here's a sample schedule:</p> <p>Month one, target the RSI Month two, gain permission to access the beach Month three, recruit and train volunteers Month four, gather the data Month five, process and distribute the data</p>
Funding	Projects planned for 2001 are funded by local jurisdictions. We are working up standard cost estimates.
Names:	<p>The Rapid Shoreline Inventory was piloted by People for Puget Sound in 2000 with the National Parks Service on San Juan Island and Friends of the San Juans, and with ReSources and the Whatcom Marine Resource Committee in Whatcom County.</p> <p>People for Puget Sound staff who work on RSI:</p> <p>Jacques White Tom Dean Phil Bloch Sarah Lord</p>

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Title	Salmon & Steelhead Inventory & Assessment Program
Brief Description	Salmon & Steelhead Inventory & Assessment Program (SSHAP): A partnership-based information system that characterizes freshwater and estuary habitat conditions and distributions of salmonid stocks in WA at the 1:24,000 scale. Data on habitat are drawn from GIS coverages, aerial photos, field surveys, existing databases, historical records, and the expertise of tribal, state and other biologists.
Objectives	To make sound scientific data for Washington's salmon recovery efforts available to local watershed groups, state and county agencies and others. Computer-generated maps will allow people to view salmon conditions over large areas, or to find information on a single stream, tributary, or estuary to give resource managers information to prioritize restoration projects.
Geographic Scope	State of Washington marine shoreline and estuaries
	Outcomes of this project will be applicable soundwide, when complete.
Subdivisions	Study area(s) are individual estuaries in Puget Sound (e.g. Nisqually Estuary) and on the coast (e.g. Willapa Bay). Nearshore habitat delineation will follow the "Shorezone" data mapping method of DNR. Geographic units are the Water Resource Inventory Areas (WRIA's). Spatial resolution is 1:24,000.
Variables	Physical and structural features, water chemistry, energy and dynamic features, vegetation, animals, habitat disturbance and change. Probably others to follow.-Historical data used will be U.S. Coast and Geodetic Survey(s), dated back to mid-late 19th century.
Data sources	DNR, USFWS, DOE, NWIFC, Tribal and County governments, U. of Washington, WCC, People for Puget Sound, etc.
Products	Products include GIS maps of historic and current extent of estuaries, with overlays of variables (see variables above) and links to other map databases, i.e. DNR's Shorezone system, and links to an Access database. The data will focus on the habitat needs of Pacific Salmon and is well suited for salmon production modeling. The intended audiences are local watershed groups, state agencies, tribes and others working to restore lost salmon habitat. Distribution will be from the SSHAP site within the WDFW website, and direct response to data requests.
Timelines	SSHAP estuary work started in August 2000 and is ongoing.
Funding	The Salmon Recovery Funding Board is funding the SSHAP project through June 2001. Funding proposals have been submitted for the next biennium.
Names:	Project lead: David H. Johnson, WDFW, johnsdhj@dfw.wa.gov Estuary/nearshore: Joseph M. Jauquet, WDFW, joe.jauquet@wadnr.gov
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Title	Skagit Estuary Restoration Assessment
Brief Description	Estimation of historic extent of tidal vegetated wetlands in the Skagit estuary and identification of areas for potential estuarine restoration.
Objectives	The project objectives are to use the "Skagit Estuary Restoration Assessment" as a guide to identify sites, and then work with land owners and funding agencies to acquire permission and funds to restore estuarine function to high priority sites in the Skagit River Delta. The principle driver for this work is a recent study by Tim Beechie and George Pess which indicates that estuarine habitat is a limiting factor for chinook salmon production in the Skagit River system. Skagit River Chinook are part of the Puget Sound Evolutionarily Significant Unit of chinook salmon that were listed as "Threatened" by the national Marine Fisheries Service under the Endangered Species Act in March of 1999.
Geographic Scope	<p>The project is focused on the lower tidal portion of the Skagit River floodplain including portions of the shorelines of Skagit and Padilla Bay.</p> <p>The project has applicability Soundwide because the methodology used could be applied to any rural estuarine system. Heavily urbanized estuaries would require a modification of the specific criteria, but the basic approach could be used to address urban areas as well.</p>
Subdivisions	<p>Much of the analysis is based on hydrologic units called "hydro blocks". These are areas within the estuary that are hydrologically isolated by roads, levees, tide gates or other barriers to tidal or river flow, that form potential sites or units for restoration.</p> <p>The tidal elevations considered in the study ranged from +9.4 feet to +19.3 feet above mean lower low water (MLLW). This elevation range provided us with a survey area that would include a variety of vegetated tidal wetlands from emergent saline marsh to scrub/shrub and forested freshwater.</p> <p>The spatial resolution of our analysis</p> <p>The horizontal resolution of the model was set a 1/4 acre cell sizes. One meter vertical intervals used in the study. It should be noted that elevations are approximate because the vertical resolution of the study is limited by the accuracy of the digital elevation model data which was derived from USGS topographic data.</p>
Variables	<p>Locations of historic blind sloughs, land elevation (defines extent of tidal wetland, tidal flooding, and seasonal flooding), connectivity of surface waters, size of hydroblocks, land ownership (including public ownership & parcels per hydro block), current land cover.</p> <p>The study attempted to reconstruct pre-European settlement conditions. The study used information from Nesbit (1885), 1889 U.S. Coast and Geodetic Survey studies, traced historic sloughs in recent aerial photos, examined elevations in U.S. Geological Survey topographic quadrangle maps (photo-revised 1968) up to +14.4 feet tidal elevation (0.00 = Mean Lower Low Water, U.S. Coast and Geodetic Survey Tide Tables and Charts, adjusted for La Conner, WA), and the current distribution of maintained drainage ditches.</p>
Data sources	<p>People for Puget Sound (2000)</p> <p>Skagit County Mapping Services (Parcel Data, 1999)</p> <p>University of Washington (10 meter, DEMs 1999)</p> <p>USGS 7.5' Quadrangles (1968-81)</p> <p>Washington State Department of Fish and Wildlife Gap Analysis (1991)</p>

	Washington State Department of Natural Resources (Washington State Public Lands Quadrangle, 1988) Washington State Department of Natural Resources (Orthophotos, 1993) Washington State Department of Natural Resources (Spatial Polygon and Line Coverages, 1995-97) Washington State Department of Natural Resources (30 Meter DEMs, 1997)
Products	I. "Skagit Estuary Restoration Assessment", People for Puget Sound (2000) format: Brief report with color plates and appendixes intended audience: Skagit County residence and policy makers, Skagit Watershed Council, Tribes, Resource Agencies, Restoration Practitioners, Local, Regional and National Funding Agencies II. "Identifying and Prioritizing Sites for Potential Estuarine Habitat Restoration in Puget Sound's Skagit River Delta", for publication in "Estuaries" (in preparation) format: Detailed scientific report with color plates and appendixes intended audience: Estuarine scientists and resource managers
Timelines	Project started in 1998, report published in 2000. Target date for initial restoration project resulting from study, summer 2002.
Funding	Project cost approximately \$60,000, with funding provided by the U.S. Fish and Wildlife Service Puget Sound Program, the Pacific Coast Joint Venture and the Pew Charitable Trusts. Data for the project was provided for free from the Washington State Department of Natural Resources, and Geographic Information System hardware donated by the Conservation Technology Support Program and software by Environmental Systems Research Institute.
Names:	Tom Dean & Jacques White, People for Puget Sound Curtis Tanner, USFWS; Martha Bra; y, Skagit Land Trust; Brian Williams, Washington Department of Fish and Wildlife
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Title	NWSC Nearshore Habitat Inventory & Evaluation
Brief Description	The project will consist of five phases: 1) Preparation of nearshore habitat maps and draft criteria; 2) Technical review of nearshore habitat data; 3) Outreach to MRCs, lead entities, and counties to present maps and refine criteria; 4) Development of final criteria; 5) Reworking of maps to show priority areas for habitat restoration & preservation. The scope of this contract includes phases 1, 4 and 5. Separate contracts or other arrangements are under consideration for phases 2 and 3.
Objectives	This short-term project will organize and analyze existing information on nearshore habitats that support marine resources in the Northwest Straits. The results of this project will: 1) assist MRCs in identifying high priority areas for habitat restoration or increased levels of conservation; 2) identify gaps in nearshore habitat information and point towards the efficient collection of that information; 3) assist the NWSC and MRCs in meeting their Benchmarks for Performance; and 4) will be designed to interact with longer-term data collection efforts in the NWS and adjacent marine areas.
Geographic Scope	Marine shoreline of the seven northwestern counties of the state (Clallam, Jefferson, San Juan, Whatcom, Skagit, Snohomish and Island Counties.
Subdivisions	
Variables	
Data sources	
Products	GIS that synthesizes geospatial data sets that describe the nearshore habitats. Maps and data files that show nearshore habitats. List of criteria that can be used to set priorities for habitat restoration and preservation. Examples of these criteria might include physical attributes that make for desirable restoration sites, such as hydrologic connectivity, possibility of replanting overhanging vegetation, etc.; other criteria might be of a more human-related nature, such as ownership of the property, availability of watershed protection on adjacent property, etc.
Timelines	
Funding	
Names:	Tom Cowan, Northwest Straits Commission
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Title	ISLAND COUNTY SHORELINE HARDENING ASSESSMENT
Brief Description	Complete citizen inventory of shoreline modifications of Island County
Objectives	Create scientifically valid nearshore habitat maps and characterize baseline conditions nearshore resources for use in protecting and restoring these marine resources, especially through the identification of potential locations for local voluntary marine protected areas.
Geographic Scope	Island County -- focused on Camano Island shoreline. (Whidbey shoreline previously completed.)
Subdivisions	Length of altered/unaltered shoreline; resolution determined by equipment selection (not yet selected)
Variables	Shoreline modification presence and description -- natural vs. man-made shoreline armoring, type, location, material, size
Data sources	Collecting data by "Shoreline Armoring is Island County: A Protocol for Volunteers" (1999) for Camano Island. These data will be combined with 1999 data developed for Whidbey Island to create county-wide information
Products	Notes, maps, and GPS datasets. An Outreach component of this project, focusing on shoreline residents, will ID future restoration/acquisition projects and contribute to BMP (Best Management Practices) manual for shoreline owners & residents. MRC will also evaluate results in process of designating local marine protected areas, or other protections, where and if deemed scientifically-based and appropriate to preservation of the resources
Timelines	Project started in 1999-2000. RFP for remaining project to issue in Spring of 2001, for completion in 2002.
Funding	Puget Sound Action Team Grant to Beachwatchers = \$ 10,000 (Phase One); Salmon Recovery Funding Board Grant = \$8,000 (amount interim). \$18,000 Total Funding
Names:	Project sponsor: Island County Marine Resources Committee (MRC) c/o WSU Cooperative Extension, PO Box 5000 Coupeville, WA 98239 (360) 679-7327 phone or fax or meehan@wsu.edu MRC CHAIR, Tom Campbell (360) 341-6387 audubon@mail.whidbey.com MRC Projects Contact - Gary Wood (360) 279-9612 gwood@whidbey.net MRC-Fiscal Officer and County Lead - Don Meehan (360) 679-7327 Principal Investigator (Phase One): WSU Beach Watchers

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Other Type:

MRC Eelgrass Project Manager -- Tom Roehl
T. J. Roehl & Associates tjroehl@whidbey.com
P. O. Box 517 -- Freeland, WA., 98249
PHONE: (360)-331-7949 -- FAX: (360)-331-7960

MRC Projects Contact - Gary Wood (360) 279-9612 gwood@whidbey.net
MRC-Fiscal Officer and County Lead - Don Meehan (360) 679-7327

Eelgrass Principal Investigator (Phase One):
James G. Norris, PhD
President, Sound Vessels, Inc.
Owner, Marine Resources Consultants
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(360) 385-4486 fax
jnnorris@olympus.net

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X Prepare BMP Handbook

Title	Kitsap Peninsula Salmonid Refugia Study
Brief Description	Identify and map remaining high quality habitat, prioritize these refugia for conservation enhancement, and restoration efforts.
Objectives	Identify and map remaining high quality habitat, prioritize these refugia for conservation enhancement, and restoration efforts.
Geographic Scope	Nearshore areas of the Kitsap Peninsula
Subdivisions	Nearshore areas divided into broad reaches based on local knowledge
Variables	Broad description of habitat quality
Data sources	Interviews with biologists, site visits
Products	Report (available at www.wa.gov/kitsap/download/Refugia_body.pdf), GIS maps for people involved with prioritizing preservation/restoration efforts, interested citizens.
Timelines	Study completed in June 2000.
Funding	County general funds, GSRO funds 1999
Names:	Keith Folkerts, Kitsap County Natural Resources Coordinator; Chris May, UW

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Title	ISLAND COUNTY FORAGE FISH HABITAT ASSESSMENT
Brief Description	Gather data on distribution of forage fish spawning in Island County and share this information along with recommended best management practices.
Objectives	The Project objectives include identification, location, mapping, and categorizing of forage fish spawning grounds in Island County's nearshore and inter-tidal environments. Work will include physical inspection and sampling to assess baseline health of the the subject ecosystems upon which to base current and future benchmark progress evaluations pursuant to the mandates of the Northwest Straits Commission mission and provide data relevant to Determining Properly Functioning Conditions (PFCs) Pursuant to The State Shoreline Management act guidelines and the ESA. Focus will be on Sand lance, surf smelt & herring spawning grounds in the nearshore environment. Resultant GIS data and GPS based mapping and catalogued data base will proved tools for implementation of "no net loss " and "net Gain" protection objectives both generally for policy implementation and specifically for prioritization of sites, for selection of future restoration /enhancement projects. The resultant filled science gaps may also provide the basis for establishing future MPA management strategies should MPA designation be warranted.
Geographic Scope	Island County's 212 miles of marine shoreline. This mapping is undertaken in conjunction with similar projects in San Juan, Jefferson & Clallam counties. Additional counties are expected to join this work in coming years as funding allows.
Subdivisions	The study area is first examined for site selection based on the decision of the supervising WDFW marine biologist. Sites are then examined in order, and repetitively as timing may affect findings. The spatial resolution of the final maps will be per GPS/GIS determinations per the equipment selected. (To be determined.)
Variables	Spawning locations by beach area or zone (i.e. low vs mid vs upper); spawn density time-from high tide, sub-strate, upper beach conditions (e.g. vegetation, bulkheads), time of year, age, & condition. Will incorporate WDFW (and other, if available) historic data where appropriate in site selection.
Data sources	Actual inspection and collection regimen by marine biologists and trained volunteers using Moulton/Penttila Forage Fish Assessment Protocol, 2000 (San Juan County Marine Resources Committee.) Lab reports of ID protocols (same).
Products	Samples, training materials, field notes, lab reports, photographs, GPS based elevation data/maps, site database (Per Slocomb), maps, BMP manual/brochures, Master Report(s), website data and exhibits, etc. All deliverable in print as well as electronic media
Timelines	April, 2001 for minimum three years. Year round sampling beginning summer, 2001. Schedule is assured for three years on "selected site basis" after which further funding will hopefully be secured.
Funding	First year Northwest Straits Commission Grant \$ 25,720 Salmon Recovery Funding Board Grant 49,000 (interim amount) Marine Ecosystem Health Program Grant 17,000 (University of California, Davis, Vet School) TOTAL TO DATE: \$ 91,720 First Year Funding NOTE: Additional funding will be continuously pursued until total County shorelines are included.
Names:	Island County Marine Resources Committee (MRC) -- project sponsor. MRC CHAIR, Tom Campbell (360) 341-6387 MRC Project Contact - Gary Wood (360) 279-9612 Dan Penttila, WDFW Project marine biologist

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- Preparation of BMP handbooks

Title	Nearshore Ecosystem Restoration Gen'l. Invest.
Brief Description	Puget Sound Nearshore Ecosystem Restoration General Investigation. This project is intended to assess the quantity and quality of the nearshore habitat in Puget sound with the purpose of identifying regions and sites for habitat restoration and enhanced levels of protection.
Objectives	1. Develop an effective coalition of public, private and Tribal interests to accomplish habitat protection and restoration on a Sound-wide basis. 2. Understand the functions and values of the nearshore habitats as an integral step to protecting and restoring the environment of Puget Sound. 3. Identify a list of habitat restoration projects for early action that can be implemented under appropriate funding sources. 4. Develop plans that will facilitate access to funding sources at the federal, state, and local levels for nearshore habitat restoration and protection. 5. Involve and serve the habitat evaluation and restoration needs of the local sponsors, regional authorities and citizens.
Geographic Scope	Puget Sound, including the Straits to the Canadian border.
Subdivisions	Not at this time-it is possible that portions of Puget Sound will be identified as critical to the overall health of the ecosystem and targetted as a result.
Variables	Both historical (Pre-European settlement) and current conditions will be addressed.
Data sources	They will be developed through the project
Products	GIS maps, and accompanying documents with descriptions. Intended audience is anyone and everyone interested in Puget Sound.
Timelines	We are currently developing a Project Management Plan and scope for the project, which will formally be undertaken (start date) after a local sponsor signs a cost sharing agreement with the Corps. This is likely to take place in late summer 2001. We anticipate a 5-10 year project. The schedule flexible.
Funding	Federal funding will be provided for 50% of the total project costs during the Feasibility Phase, which will probably take 5 years-this phase entails collecting the available information, identifying data gaps and needed studies and conducting those studies to fill the gaps. After a programmatic EIS is written for the project, we go into a Design Phase for identified projects to be constructed and then the Construction Phase.
Names:	Currently, the Corps of Engineers is spearheading the project. We are attempting to partner with a local sponsor, but this sponsor has yet to be finalized. Once they are identified and agree to cost share with us, they will be co-leads in the project.
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Title	Video-Assessment of Rocky Habitat & Fishes
Brief Description	Official Title: Video-Acoustic Assessment of Rocky Habitat and Fishes in Puget Sound.
	The project is primarily a WDFW in-house attempt to quantify the amount of rocky habitat within the interior marine waters of the State of Washington. The current focus of the project is on the nearshore waters from 0 mllw to -40 m mllw.
Objectives	The primary "driver" of the project is to improve the management of rocky habitat fishes in Puget Sound. By quantifying and mapping rocky habitat in Puget Sound we can improve our rockfish and lingcod population assessments by designing surveys that sample only those habitats likely to be occupied by these species.
Geographic Scope	The interior marine waters of Washington State east of Cape Flattery. - The outcomes of this project are applicable soundwide.
Subdivisions	The overall study area has been sub-divided based on WDFW Groundfish Management Regions (GMR's). Within each GMR, the area is further sub-divided on the basis of perceived or known habitat quality as follows: 1) no rock habitat present; 2) some or potential rocky habitat; 3) rock habitat present. The geographic units and spatial resolution of the project have varied over time, but currently are measured in square nautical miles and/or hectares.
Variables	Variables to be addressed include substrate type, level of relief and/or slope, habitat complexity, depth, floral and faunal cover. Because the GMR surveys are repeated over time, the database will be historical with a starting date of 1993.
Data sources	Underwater video and SCUBA surveys.
Products	Annual State and Federal reports, WDFW Technical Reports, refereed Publications, CROM database. Intended for agency staff and scientific fora.
Timelines	Ongoing, indefinite (based on staff and budget limitations). Surveys of one or multiple GMR's are generally conducted from July to October on an annual basis.
Funding	State funding. Approximately \$200,000/year.
Names:	Bob Pacunski, Wayne Palsson - Wash. Dept. Of Fish and Wildlife

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Other Type:

Title	Washington State ShoreZone Inventory
Brief Description	The project inventoried Washington State's saltwater shorelines statewide between 1994 and 2000. The resulting GIS data set describes physical and biological littoral features
Objectives	The objective of the inventory project was to characterize shoreline habitats on a landscape scale as part of the Puget Sound Ambient Monitoring Program. Physical and biological components of habitat were described (see list below). Because it provides a landscape context for nearshore habitat patterns, the data set is useful to researchers and planners for a variety of projects.
Geographic Scope	All of Washington State's saltwater shorelines, approximately 3067 miles.
Subdivisions	We conducted a synoptic inventory, so the study area can be partitioned in a variety of ways. The shoreline was divided into shore units based on physical characteristics. Average unit length is approximately 0.5 miles. Scale = 1:24,000
Variables	Below is a summary of features described, see the project documentation for a complete list: Vegetation (e.g., eelgrass, kelp, surfgrass, green algae, Sargassum) Geomorphic form Geomorphic material (Substrate type, such as boulder, cobble, pebble, sand) Wave exposure Sediment source and abundance Shoreline modification (e.g., bulkheads, piers, docks, slips) Riparian overhang Oil residence index Shoreline type (British Columbia shoreline type, Dethier classification and NRDA classification)
Data sources	Aerial video imagery collected from a helicopter with simultaneous voice commentary by a geomorphologist and a biologist.
Products	GIS data was released on CD. Reports and papers on spatial trends in nearshore habitats are being produced for scientific and resource management audiences.
Timelines	The inventory is complete. There is no current plan for future sampling.
Funding	ALEA funding through PSAMP. Project cost for collection, analysis and data release was approximately \$500,000 (includes contract funds and in-house costs).
Names:	Nearshore Habitat Program, Washington Department of Natural Resources (Betty Bookheim, Helen Berry, Amy Sewell, Tom Mumford) Coastal and Ocean Resources (John Harper)
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Title	Kelp Canopy Monitoring
Brief Description	The project assesses patterns in the abundance and distribution of kelp canopies over space and time. The kelp canopy has been inventoried yearly since 1989 using aerial photography.
Objectives	<p>The objective of the monitoring project is to track spatial patterns and temporal trends in kelp canopies. This data has widespread applicability to understanding the status of kelp beds and connections to the species that utilize them. Kelp beds are important nearshore habitats that support commercial and sport fish, invertebrates, marine mammals and marine birds. Many factors, both natural and anthropogenic, are known to affect the extent and composition of kelp beds.</p> <p>The primary purpose of the program is to report on the status of one indicator of nearshore habitat condition as part of the Puget Sound Ambient Monitoring Program. The data is also used for resource assessment and management projects. For example, NOAA uses it for Essential Fish Habitat evaluation, it was used to assess resources associated with the Tenyo Maru oil spill.</p>
Geographic Scope	<p>The kelp canopy monitoring study area includes the mainland shoreline along the Strait of Juan de Fuca and Washington's outer coast, from Port Townsend to the Columbia River.</p> <p>The project is not currently applicable sound-wide, but we are considering expanding the project study area to make results applicable soundwide.</p>
Subdivisions	We conduct synoptic mapping, so the area can be subdivided in multiple ways for analysis. For analysis, we subdivide the area into outer coast vs. straits, and also compare stretches of shoreline. Scale = 1:12,000
Variables	<p>Kelp canopy area Kelp bed (planimeter) area Kelp canopy density per bed Species composition</p> <p>Back to 1989 with current methodology</p>
Data sources	Aerial photography, collect annually.
Products	GIS data will be released on CD. Reports and papers will be produced for scientific and resource management audiences.
Timelines	Ongoing annual summer sampling since 1989 (except 1993). Exact sampling dates vary slightly based on tides and weather.
Funding	Approximately \$45,000 per year (includes contract funds and in-house costs)
Names:	Nearshore Habitat Program, Washington Department of Natural Resources (Helen Berry, Amy Sewell, Tom Mumford, Betty Bookheim) Ecoscan (Bob Van Wagenen) NOAA, Olympic National Marine Sanctuary (Ed Bowlby)
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Title	Submerged Vegetation Monitoring
Brief Description	The focus of this project is to design and implement a monitoring program that will assess the trends of abundance, distribution, and health of subtidal eelgrass (<i>Zostera marina</i>) and other marine vegetation in Puget Sound.
Objectives	The primary driver is to use eelgrass abundance as one nearshore indicator of health for the Puget Sound Ambient Monitoring Program. The project will be implemented in three phases with the first phase having 4 primary goals. Phase 1: Monitor broad scale submerged vegetation (eelgrass) trends in distribution and abundance in Puget Sound at sampling sites. Phase 1 has four main goals: 1. Capture temporal trends in submerged vegetation abundance and distribution, specifically eelgrass, in Puget Sound. 2. Summarize temporal trends over large areas. 3. Monitor vegetation parameters that are strong indicators of the extent and quality of nearshore vegetated habitat. At a minimum, eelgrass (<i>Zostera marina</i>) must be monitored and mapped to its full bed extent including subtidal and intertidal extremes. 4. Consider stressors. A major focus of the PSAMP is to correlate environmental trends with stressors to the greatest extent possible and to differentiate natural and anthropogenic stressors. At a minimum, temporal trends in submerged vegetation must be considered along some continuum of pristine/degraded conditions.
Geographic Scope	Sound-wide. We made a great effort to include the whole Sound and the Strait of Juan de Fuca. Portions of South Puget Sound were excluded from the sampling protocol because <i>Z. marina</i> does not occur there.
Subdivisions	One level of analysis will be based on 5 Regions, roughly equivalent to the oceanographic Basins. One strata of sampling units in the study, the fringing eelgrass beds is based on 1,000m segments of the -20' bathymetric contour in Puget Sound. The other, the broad flats sites, are individually defined and range from 27 acres to 18,000 acres. Spatial resolution is multi-scalar. Smallest sample is 1m ² . Eelgrass bed resolution is larger.
Variables	<ul style="list-style-type: none"> • Eelgrass abundance (basal area coverage of individual beds) • Maximum and Minimum depth of eelgrass beds at each site • Leaf Area Index (shoot density multiplied by leaf surface area) • Shoot to Root ratio (above ground biomass divided by below ground biomass). • Shoot density • Patchiness index • Water quality parameters (temperature, salinity, DO, turbidity, PAR, backscatter, fluorescence) • Sediment hardness and roughness • Depth (+ or - 0.5 ft) <p>There will re-sample diving data collected in 1962-3 by Ron Phillips, maps made by Dave Jamison, and examine WDFW herring rake data starting from the mid-1970's.</p>
Data sources	We are collecting data each year using underwater video, filming linear transects over eelgrass beds of selected sampling sites throughout the Sound. Other parameters are calculated from these samples and benthic grab samples collected at selected sites.
Products	Annual project reports including summaries of data collected each year and annual reports with summaries of the data analysis. After several years of data collection, we will generate reports analyzing the data and reporting on trends. We plan to create GIS layers of the sites where data were collected
Timelines	This project was initiated in April 2000, the data collection methods were developed and the first year of data were collected summer of 2000. We intend this to be a long term monitoring program and currently have two years of funding to continue with collections in 2001 and 2002. Sampling protocol and statistics are projected for 50 years.
Funding	We are using ALEA provided funds. \$100,000/year (\$200,000/biennium).
Names:	Amy Sewell, Tom Mumford, Helen Berry, Betty Bookheim, Department of Natural Resources, Nearshore Habitat Program Jim Norris, Marine Resources Consultants, Port Townsend, WA Sandy Wyllie-Echeverria School of Marine Affairs, University of Washington John Skalski School of Fisheries, University of Washington

Richard C. Zimmerman, Moss Landing Marine Laboratories Kern Ewing, College of Forest Resources, University of Washington
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Title	Nearshore Habitat Mapping of C. & W. SJdF
Brief Description	To define geographic areas of high habitat function for listed and critical resource stock along the central and western Strait. Through field work and coordination provide local educational opportunities illustrating the importance of nearshore to regional resources
Objectives	Working closely with local groups, continue nearshore mapping efforts of the MRC. Specifically: 1) Catalog surfsmelt and sandlance spawning habitats; 2) Using WDFW protocols, document locally known but uncataloged herring spawning sites of the region, and; 3) Document locally known but uncataloged juvenile salmonid use of kelp beds. Data will be analyzed to define priority areas for further management consideration.
Geographic Scope	Dungeness Bay to Neah Bay
Subdivisions	10 beaches sampled for surf smelt and sandlance spawn 5 embayments sampled for herring spawn 5 kelp beds sampled for juvenile salmon use
Variables	Sandlance & surfsmelt: A minimum of 10 beaches will be sampled for surfsmelt and sandlance spawn using WDFW protocols (Pentilla 1995). Beaches from Dungeness Bay to (and including) Neah Bay will be sampled at bi-weekly intervals for the entire spawning seasons of both surfsmelt and sand lance. Herring: Five embayments known locally for herring spawning activity will be sampled for herring spawn using standard WDFW herring spawn deposition sampling techniques (O'Toole 1995; Pentilla pers.comm.). Juvenile salmonids: Five kelp beds with known or suspected high juvenile salmonid use will be sampled bi-weekly throughout the juvenile migratory season. Fish densities will be quantified through a series of permanent transects sampled via snorkeling. Beach seines and stream surveys (if available) along shorelines of kelp beds will be compared to confirm juvenile salmonid species composition, sizes, and densities in nearshore areas.
Data sources	New data collection
Products	1. Forage fish spawning maps for central and western Strait will be compiled into a summary report. A copy will be provided to the WDFW for updating forage fish maps); 2. A synopsis of juvenile salmonid use of kelp beds of central and western Strait will be included into a final report. The synopsis will include a map showing juvenile salmonid use for each area. Data synopsis of both beach seines and kelp bed surveys will include salmonid species composition, size, and densities by location. The report will include discussion on juvenile salmonid use of kelp beds, including observed differences (if any) of kelp bed use, and recommendations for future management options for priority areas
Timelines	Sampling will begin the first week in May 2001 and continue to March 2002. Deliverables provided by May 2002
Funding	\$30,000 requested from NWSC \$17,880 in kind from WDFW, Clallam Co., City of Port Angeles & Peninsula College
Names:	Anne Shaffer, Washington Department of Fish and Wildlife, 332 E. 5th Street Port Angeles, Washington, 98362. 360-457-2634/417-3302fax. shaffjas@dfw.wa.gov
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Title	Mar. Shoreline Data Integration & Drift Cell Char.
Brief Description	Integrate and disseminate currently available information on marine shoreline characteristics to facilitate the use of these data in shoreline management and salmon recovery decisions. Characterize littoral drift cells on Washington's marine shorelines based on existing data and including descriptions of key physical and biological features as well as shoreline modifications and land use. The characterizations will also describe significant physical and biological processes (e.g. sediment delivery, riparian shading) and the functions they support (e.g. spawning/rearing, migratory corridors). Finally, the characterizations will include interpretive information evaluating potential resource management concerns for each littoral cell.
Objectives	Integrate and provide easy access to key marine shoreline data sets. Characterize Washington's littoral drift cells using existing data and develop a map-based product that supports shoreline management, salmon recovery, and other natural resource management activities. Disseminate these products to state and local resource managers.
Geographic Scope	Sound-wide
Subdivisions	Basins will be described by aggregations of drift cells which (typically) include multiple ShoreZone units which are often represented by multiple oblique aerial photos.
Variables	Shoreline associated sediment characterizations: beach stability, erosional areas, sediment sources, slope steepness, mass wasting, fluvial sources, incident wave energy, accretion areas Shoreline vegetation features: salt marshes, eelgrass, floating kelp -- especially their location relative to sediment drift and exposure Disturbance/human influences
Data sources	DNR's ShoreZone system; · Ecology's drift cell delineations; · WDFW's maps of critical spawning habitat for surf smelt, sand lance and rock sole; · Ecology's oblique aerial photos (2000-2002 Series) · Other relevant shoreline layers
Products	Descriptions of individual drift cells: sediment sources and accreting areas, habitat narrative, upland land uses, ShoreZone units. Available on the web.
Timelines	Work initiated in spring 2001 but full effort is pending funding -- proposals in to Natural Resources Data Pool and NOAA Begin in Whidbey Basin, especially Snohomish shoreline; then soundwide
Funding	\$383,000 requested from Natural Resources Data Pool
Names:	Cinde Donoghue, Ecology (360-407-7257) Scott Redman, PSAT (360-407-7315) Brian Lynn, Ecology (360-407-6224) Tom Mumford, DNR (360-902-1079) Helen Berry, DNR (360-902-1052) Mary Lou Mills, DFW (360-902-2834)

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Other Type:

Title	San Juan County Forage Fish Project
Brief Description	
Objectives	To identify important forage spawning habitats within San Juan County and initiate actions to reduce habitat loss.
Geographic Scope	San Juan County
Subdivisions	Moulton/Pentilla prioritized beaches of San Juan County Spatial resolution less than 9 feet
Variables	Presence or absence of spawn
Data sources	Field survey High-res. digital shoreline provided by Dale Gombert of Fish and Wildlife
Products	High-res. GIS map and accompanying report of spawn habitat throughout SJC.
Timelines	2 years Beginning Feb 2001 finish March 2003 - First phase
Funding	\$238,241 -- 70% SRFB & 30% from Marine Ecosystem Health grant and donated labor.
Names:	Larry Moulton, Forage Fish Coordinator, FSJ and SJC MRC Kevin Ranker, Director, FSJ Shann Weston, Environmental Programs Coordinator, FSJ Jim Slocomb, Natural Resource Planner, FSJ – Chair SJC MRC Dan Pentilla, Fish and Wildlife Chris Coulter, Administrative Assistant, FSJ Laura Arnold, Director, SJC Planning Department
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Other Type:

Title	San Juan Shoreline Stewardship Program
Brief Description	Rapid Shoreline Inventory coordinated by Friends of the San Juans
Objectives	To provide a baseline shoreline inventory for resource management decisions and to identifying critical habitats for further more detailed analysis within San Juan County.
Geographic Scope	Some portion of San Juan County
Subdivisions	150 foot segments
Variables	Intertidal, backshore, and bluff characteristics (including substrate, slope, vegetation, invasive species, etc.) and adjacent land uses.
Data sources	Data collection by RSI
Products	GIS map of San Juan County Shorelines inventoried
Timelines	
Funding	PIE P00-06 and last year NW Fund for the Environment. As of the end of the current PIE contract May 15, 2001 we have no monies for our Shoreline Stewardship Program
Names:	Shann Weston, FSJ Kevin Ranker, FSJ Chris Coulter, FSJ
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Other Type:

Title	State of the Nearshore Report (King County)
Brief Description	The purpose of this State of the Nearshore Report (SONR) is to provide a current, fundamental understanding of major ecological conditions, habitats, processes and resources that occur in the nearshore zone of WRIAs 8 and 9.
Objectives	<p>The report will serve several specific purposes/objectives:</p> <ol style="list-style-type: none"> 1., Provide a basis for nearshore watershed planning and salmon recovery efforts. 2., Provide direction for future technical work through identification of data gaps. 3., Serve as a resource to researchers, planners and managers dealing with nearshore issues in WRIAs 8 and 9.
Geographic Scope	Nearshore zone of WRIAs 8 and 9
Subdivisions	<p>The authors have further divided the study area into 12 sub-areas (reaches) to assist in describing the location and status of particular marine resources in this report. WRIA 8 encompasses reaches 1 through 3, and WRIA 9 includes reaches 4 through 12; reach 4 represents Elliott Bay, and reaches 9 through 12 cover Vashon and Maury Islands.</p> <p>Reach 1: Eliot Point to Edwards Point Reach 2: Edwards Point to Meadow Point Reach 3: Meadow Point to West Point Reach 4: West Point to Alki Point Reach 5: Alki Point to Point Williams Reach 6: Point Williams to Brace Point Reach 7: Brace Point to Three Tree Point Reach 8: Three Tree Point to Dumas Bay Reach 9: Vashon Point to Point Robinson Reach 10: Point Robinson to Piner Point Reach 11: Piner Point to Neill Point (including Quartermaster Harbor) Reach 12: Neill Point to Vashon Point</p>
Variables	The report begins with a discussion of a conceptual model of the nearshore ecosystem followed by information on the physical features of Puget Sound. Subsequent chapters focus on nutrient dynamics and water quality, primary productivity, the nearshore food web, various habitat types, selected species of fishes and invertebrates, and the effects of human activities on nearshore habitats and species. Chapter 10 provides a case study of Elliott Bay and the Duwamish subestuary, the most heavily urbanized and industrialized portion of the study area.
Data sources	Existing published literature
Products	State of the Nearshore Report
Timelines	Final report due end of May
Funding	
Names:	<p>Battelle Marine Sciences Laboratory Sequim, Washington</p> <p>Pentec Environmental Seattle, Washington</p> <p>Striplin Environmental Associates Seattle, Washington</p> <p>Shapiro Associates, Inc. Seattle, WA</p> <p>King County Department of Natural Resources Seattle, Washington</p>

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Title	East Jefferson Forage Fish Study (SRFB & MRC)
Brief Description	Sample 10 or more beaches for surf smelt and sand lance spawn, evaluate egg mortality and limits of survivability, and update baitfish spawning maps. This project continues work being done on the Dungeness/Clallam County shoreline.
Objectives	Identify preybase spawning areas along East Jefferson County shoreline, monitor egg mortality and other survival indicators.
Geographic Scope	East Jefferson County shoreline
Subdivisions	10 (or more) individual beaches -- Indian Island Navy Reserve, WDFW property, Irondale, Pt. Townsend, Ft. Flagler, Ft. Worden, Dosewallips State Park
Variables	presence/absence of spawn (surf smelt & sandlance); egg mortality and other survival indicators; limits of egg survivability
Data sources	Data being collected according to WDW standard protocols
Products	Updated baitfish spawning maps
Timelines	
Funding	\$46,640 SRFB; \$8,300 local
Names:	Paula Mackrow, North Olympic Salmon Coalition

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Other Type:

Title	Citizen Inv. of Skagit Co. Crit. Shoreline Habitat
Brief Description	Rapid Shoreline Inventory by P4PS with studens from Anacortes High School
Objectives	Educate citizens (students) about shoreline resources. Develop recent data on shoreline resources at a location that was convenient for students
Geographic Scope	Eastern side of March Point -- not continuous (some land owners did not permit access), but refinery properties were inventoried.
Subdivisions	150 ft segments
Variables	shoreline (interidal, backshore, bluff) characteristics, including substrate type, slope, vegetation, invasive species; adjacent land uses
Data sources	Data collected by RSI protocol in April 2001
Products	Public meeting will present data to public & data gatherers GIS maps of shoreline resources
Timelines	Data collection in April 2001
Funding	Northwest Straits Commission
Names:	Mike Cawrse, Skagit County Public Works

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Other Type:

Title	Critical spawning habitat for fish in Puget Sound
Brief Description	A series of maps depicting known spawning areas for herring, surf smelt, sand lance and rock sole in Puget Sound. The publication is designed to be a guide for land use decisions for local governments and interested citizens.
Objectives	Identify known spawning habitat of forage fish in Puget Sound to provide protection to these habitats. These areas have been described as "saltwater habitats of special concern: (WAC-2220-110-250). In addition, the Wild Salmonid Policy requires that the functions and values of herring spawning habitats and intertidal spawning areas be maintained.
Geographic Scope	Puget Sound, including the Strait of Juan de Fuca, Hood Canal and the San Juan Islands. Outcomes of project are applicable soundwide.
Subdivisions	Depicted on scale of 1:63360
Variables	Geographical location of spawning habitats, using both current and historical conditions combined. Historic back to 1972.
Data sources	WDFW spawning ground survey field notes and data summaries.
Products	A three ring notebook with introductory text and maps. The intended audience is local governments, and citizen groups. The notebook has been distributed to local governments and several environmental groups. Notice of availability is on WDFW webpage.
Timelines	1999 to March 2000
Funding	Puget Sound Action Team. Funds initially from EPA (\$14,000)
Names:	Greg Bargmann, Dale Gombert, Lori Guggenmos and Dan Penttila all with the Washington Dept. of Fish and Wildlife.
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Other Type:

Title	Kitsap County Shoreline Inventory
Brief Description	Collecting and compiling data for GIS system on estuarine and nearshore habitats. We collected all the available information we could to develop our base maps and then went out and did a physical inventory of the 190 miles of marine shoreline.
Objectives	The project objective was to chart the changes and inventory environmental features that were missed during original inventory (conducted approx 30 yrs ago).
Geographic Scope	The scope of the project was the unincorporated shorelines of Kitsap County. The outcome is applicable soundwide only in the context that it is a segment of the Puget Sound and is regulated by the SMA.
Subdivisions	Study area not divided. Spatial Resolution is 1:24,000 (no quality control checks)
Variables	We looked at historic development patterns as well as potential for development in light of environmental sensitivity of property.
Data sources	DNR, DOE, DFW, DOT provided data for the creation of our base maps.
Products	Shoreline inventory maps to be used within the context of the regulatory programs of the county and state DOE.
Timelines	grant extended to May 31
Funding	\$30,000 grant from DOE, plus a 50% match from the county.
Names:	Renee Beam, Kitsap County Shoreline Administrator and David Nash, Kitsap County GIS Group. With a lot of help from every one else in the department.

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Other Type:

Title	Snohomish County Shoreline Inventory and Outreach
Brief Description	Gathering new data and integrating it into a shoreline inventory database using Geographical Information Systems (GIS). The inventory may also contribute to Snohomish County's shoreline management master program update. A series of community outreach events will be conducted at key locations along the Snohomish County marine shoreline during the inventory fieldwork period to raise local awareness about the MRC and marine resource conditions.
Objectives	<p>The primary driver of this project is the Snohomish County MRC's need for baseline information that the MRC can use to identify marine habitat conservation priorities in the county. These priorities will be framed within the context of the Northwest Straits Initiative benchmarks for performance.</p> <p>Project objectives:</p> <ul style="list-style-type: none"> ·Identify and review shoreline inventory methodologies and existing data sets. ·Gather new shoreline data and integrate it with existing and planned county data. ·Conduct community outreach events in conjunction with data gathering. ·Support the identification of candidate sites for potential Marine Protected Areas and future restoration activities. <p>Support the potential revision of shoreline management master programs consistent with Path B of the proposed guidelines.</p>
Geographic Scope	The geographic scope of this project is limited to Snohomish County. The shoreline inventory protocol we develop may be of interest to other counties or MRCs throughout the Puget Sound.
Subdivisions	This will be determined once the inventory protocol is finalized.
Variables	This project will address current on-the-ground shoreline conditions according to the following general parameters: Substrate; Vegetation; Shoreline alterations; Outfalls; Barriers to wildlife migration
Data sources	Primary shoreline inventory data will be collected in the field. This primary data will be integrated with other existing data to create a shoreline inventory database using Geographical Information Systems (GIS). Existing data sources that may be used include: DNR ShoreZone Data Inventory, DOE Puget Sound shoreline aerial photos, City of Everett 2001 Shoreline Master Program Update, City of Mukilteo 2001 Shoreline Master Program Update, Tulalip Tribes Nearshore Habitat Assessment, and the Marine Outfall Siting Study (MOSS),
Products	<p>1., Spatially referenced Snohomish County shoreline inventory database, to be used by Snohomish County MRC.</p> <p>2., Outreach event communications, such as fliers, posters, newspaper articles, etc.</p>
Timelines	<p>April-May, 2001, Identify and review marine shoreline inventory methodologies and existing data sets.</p> <p>May-June, 2001, Identify marine shoreline property owners and mail requests for property access to conduct the inventory.</p> <p>April-Sept., 2001, Develop and implement outreach program.</p> <p>June-August, 2001, Conduct fieldwork for inventory data gathering and integrate new data with existing and planned county data.</p> <p>Sept.-Dec., 2001, Analyze project outcomes and prepare final report.</p>
Funding	<p>Funding source: Northwest Straits Commission</p> <p>Total project cost: \$30,000</p>
Names:	<p>Project manager: Will Hall, Snohomish County Surface Water Management (SWM)</p> <p>Assistant project manager: Sean Edwards, SWM</p> <p>Field protocol developer: Ted Parker, SWM</p> <p>Outreach coordinator: Jeff Carter, SWM</p> <p>Field technician/database compiler: Private consultant yet to be determined</p>
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Title	Shoreline Inventory of Whatcom County
Brief Description	Compilation of existing data (Anchor Environmental) and Rapid Shoreline Inventory (Resources/P4PS)
Objectives	Characterize portion of Whatcom County shoreline using available data and citizen-based inventory
Geographic Scope	Some portion of Whatcom County shoreline
Subdivisions	Unknown if any for data compilation; 150 foot segments for RSI
Variables	Unknown for data compilation; RSI collects information on intertidal, backshore and blu characteristics (including substrate, slope, vegetation, invasive species, etc.) and adjacent land use
Data sources	Unknown for data compilation (assumed to be Bellingham Bay project; DNR data from aerial multispectral & IR photo)
Products	
Timelines	
Funding	Northwest Straits Commission
Names:	Bruce Roll, Whatcom Co. MRC

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Other Type:

Title	Marine bird monitoring by aerial surveys (PSAMP)
Brief Description	Winter aerial surveys of all nearshore and a sampling of open water areas of Puget Sound to produce density and distribution data.
Objectives	Characterize status and trends of Puget Sound marine bird populations to support evaluation of actions to protect and restore the ecosystem
Geographic Scope	Puget Sound wide
Subdivisions	Nearshore (<20 m depths) and deep water (>20 m) strata defined for any/all areas of Puget Sound. Data are routinely presented as density indices for 1 or 2 minute grid cells. Data are extrapolated from counts of birds on transects/track lines.
Variables	Density indices for diving ducks, alcids, grebes & loons, and other species.
Data sources	Ongoing annual (winter) surveys.
Products	Standardized GIS output (including paper maps and electronic files); WDFW technical reports
Timelines	Monitoring surveys are annual; reporting is not on a set schedule
Funding	State general fund provided for PSAMP
Names:	Dave Nysewander, WDFW

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Other Type:

Title	Digital Coastal Atlas
Brief Description	Digital data related to coastal management presented on the Web -- currently available on Ecology's intranet (MapObjects); transition to internet as an ARC/IMS application
Objectives	Make diverse data layers available for visualization and analysis by agency staff, local planners, citizens/property owners and entities involved in salmon recovery.
Geographic Scope	Marine shoreline of Washington State
Subdivisions	No overarching subdivisions although each component data set has its inherent subdivisions (e.g., oblique aerial photos; USGS maps)
Variables	Drift cells, WRIAs, wetlands (simplified categories from NWI), listed wildlife species, facilities (dams, discharge sites, hazardous material sites, storage sites), commercial shellfish growing areas with classificaitons, drinking water wells, city & county boundaries, townships/sections, roads, waterbodies, oblique aerial photos (link), 303d listed surface waters, background images (topo maps, orthophotos, shaded relief)
Data sources	Various agencies
Products	Web-served interactive mapping software and data
Timelines	Currently available on Ecology intranet No specific timeline for transition to ARC/IMS and internet
Funding	??
Names:	Cinde Donoghue, Ecology (360-407-7257)

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Other Type:

Title	Key Peninsula Nearshore Salmon Habitat Assessment
Brief Description	
Objectives	To provide the habitat information needed to develop a strategy for protection of remaining good habitat and restoration of other nearshore salmonid habitat. To identify and map (GIS) habitat and its condition.
Geographic Scope	144 miles of Pierce County shoreline on Key and Gig Harbor peninsulas and Fox and Anderson islands.
Subdivisions	144 miles of Pierce County shoreline on Key and Gig Harbor peninsulas and Fox and Anderson islands.
Variables	To be determined (TBD).
Data sources	TBD.
Products	GIS coverages, in Arc View. Will be available through County View on website. Report on habitat quality, identifying best remaining habitat.
Timelines	Start Summer 2001, finish end of 2002. Not yet firm - i.e. could change in either direction.
Funding	\$100,000 -- 85% from SRFB and 15% local appropriation, labor and donated labor.
Names:	Dave Renstrom, Pierce County Water Programs Division, project manager

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Other Type:

Title	Programmatic Caged Mussel Study (DNR)
Brief Description	Estimating chemical exposure to herring eggs at selected sites in Puget Sound using caged mussels as biological integrators to estimate concentrations of bioavailable chemicals in the waters of selected herring spawning grounds
Objectives	<p>Project objectives are to understand potential for chemical contamination to have a negative impact on spawning stocks of Puget Sound herring, by using caged mussels as biomonitors.</p> <p>The original driver for this work was concern about the precipitous decline in spawning herring at Cherry Point and the potential for herring to be listed under the Endangered Species Act. (NMFS has recently determined that Puget Sound herring don't warrant listing.)</p> <p>We wanted to compare ambient conditions at Cherry Point with other areas where there are healthier spawning stocks to see if there are differences. This complements data collected at Cherry Point in previous years, possibly presenting some time series information at Cherry Point as well as samples over a broader geographic area.</p>
Geographic Scope	The outcomes may have sound-wide applicability. Mussels were deployed at Cherry Point, Fidalgo Bay, Port Gamble, and Brownsville.
Subdivisions	<p>The areas were chosen to coincide with herring spawning grounds, and to try to get some idea of the variability among different sites in the same area. Cages were deployed as follows:</p> <p>Cherry Point: 3 cages at each of 5 sites; Arco, Gulf Road, Intalco, Midpier, and Tosco Fidalgo Bay: East Pier, Center Pier, West Pier Port Gamble: Little Boston, Sawmill, Teek Bluff Brownsville: North Marina, South Marina, University Point</p> <p>Unfortunately, not all the cages were retrieved.</p>
Variables	Parameters analyzed: animal growth (length; whole animal, tissue, shell weight); percent lipids; percent solids; PAHs and their alkylated homologs (~54 analytes); metals (As, Hg, Cd, Cu, Pb, Zn, Se)
Data sources	methods and to some extent site selection relied on previous mussel cage work by Applied Biomonitoring in 1998 and 1999. DFW information about herring stock status and spawning ground locations were also used to select sites.
Products	Final report to DNR. Format will be printed/electronic report, will be distributed to members of the Cherry Point Technical Workgroup (an information exchange group consisting of members from Cherry Point industries, environmental groups, state agencies, Tribes and interested others.)
Timelines	This phase started June 2000. Deadline for final report is June 2001. Data have been collected and draft report has been written.
Funding	Funding from DNR internal funds. Total cost \$36,149
Names:	Michael Salazar and Sandra Salazar of Applied Biomonitoring, with support from volunteers at DNR.
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Title	WSU Beach Watcher Baseline Intertidal Monitoring
Brief Description	Beach Watcher volunteers collect intertidal data from 25 beaches around Whidbey Island, and one beach on Camano Island. Our protocol has three components: 1. Beach profile. We measure changes in beach topography and collect presence/absence information on substrate (clay, sand, gravel cobble etc.), seaweeds (red, brown, green macroalgae), seagrass and invertebrates (chitons, limpets, snails, crabs, etc.) at each elevation interval - every 10 feet on most beaches. 2. Quadrat counts of seaweed species (percent cover) and invertebrate species (density) at +1ft., 0 ft., and -1ft. tide heights. We count three quadrats per tide level spaced 5 to 20 feet apart depending on the monitoring site. 3. A species list of individual species found on a particular beach from year to year is maintained by about 2/3 of our teams.
Objectives	The objectives of the project are twofold: 1) To foster a sense of stewardship in community volunteers through yearly monitoring activities and continuing education and training opportunities in marine ecology. 2) Collect baseline data to be shared with local and regional citizens, governments, agencies and institutions (anyone who's interested!), and eventually link our information with other data collection efforts.
Geographic Scope	Geographic scope of the project is Island County. Our methods are applicable sound wide.
Subdivisions	26 monitoring sites in Island County. Each site extends from the backshore area to low tide, covering a profile swath approx. 20-30 ft wide depending on site. Monitoring occurs during summer low tides. Profile readings and algae/invertebrate surveys are taken every 10 ft. on most beaches.
Variables	Natural and human induced changes to individual sites, clearing, hardening, etc, and their effects on the biota of the monitoring site.
Data sources	
Products	Annual report summaries (see objectives above)
Timelines	Data collection began in 1996 (1995 for some beaches). Monitoring has continued every summer since 1996.
Funding	The monitoring program is a division of the WSU Beachwatcher program. Most funding comes from the parent program. Have also received monitoring grants for special projects from state and local agencies and governments.
Names:	Jan Holmes (360) 678-3905. Over eighty Beach Watcher volunteers participate in monitoring. Individual names are available through Sarah Schmidt, our Beach Watcher program coordinator. Sarah Schmidt (Coordinator) + 80 volunteers
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Title	DNR Puget Sound Herring Study 2000
Brief Description	1. Sound-wide spawning success and larval survival potential. 2. Sound-wide survey of Ichthyophonus hoferi in spawning herring.
Objectives	Objectives are to compare the larval success, larval survival potential, and parasite infestation levels of several Puget Sound herring stocks. DNR also intends to correlate this information with the chemical data gathered in the mussel study described above, the extent possible. The original driver for this work was concern about the precipitous decline in spawning herring at Cherry Point and the potential for herring to be listed under the Endangered Species Act. (NMFS has recently determined that Puget Sound herring don't warrant listing.) We wanted to compare ambient conditions at Cherry Point with other areas where there are healthier spawning stocks to see if there are differences. This complements data collected at Cherry Point in previous years, possibly presenting some time series information at Cherry Point as well as samples over a broader geographic area.
Geographic Scope	Herring spawning locations from central Puget Sound north to border and west to Discovery Bay -- Cherry Point, Port Gamble, Quartermaster Harbor, Port Madison/Brownsville, Port Susan, Holmes Harbor, Discovery Bay, Quilcene Bay, Fidalgo Bay, Samish Bay, Semiahmoo Bay, Drayton Pass, Harney Channel, Port Townsend Bay, Skagit Bay
Subdivisions	See specific locations above
Variables	For embryos: hatching success, dead larvae, deformed larvae, larval weight at hatch, larval weight at yolk resorption, yolk abundance at hatch, survival to yolk resorption, deformed larvae at 7 days For Ichthyophonus survey: prevalence among different stocks, correlations with stock biomass trends, stable isotope analysis to determine if food sources differ with Ichthyophonus levels, genetic similarity of Puget Sound Ichthyophonus to the Norton Sound, Alaska strain. -- not historic, but we will eventually compare data collected in 2000 with similar information from 1992, 1996, and 1998-1999.
Data sources	Previous work by Kocan et al. for DNR in 1992, 1996, 1998, 1999 DFW spawning survey data
Products	A final report is to be provided to DNR. It will be shared with the CherryPoint Technical Workgroup and other interested parties.
Timelines	Started February 2000 Draft final report was due in February 2001 but has not been received. Final report is due in April 2001. Current contract terminates June 30, 2001.
Funding	DNR internal funds: \$41,646 (through a cooperative agreement with UW that waived \$10,828 of indirect costs)
Names:	Dr. Richard M. Kocan and Dr. Paul Hershberger, School of Fisheries, University of Washington
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Title	New marine habitat indicator for PSH 2002
Brief Description	Develop and report on an indicator of fish and wildlife habitat in Puget Sound.
Objectives	<p>The Puget Sound Action Team currently tracks the status of 17 indicators and reports on them in a biennial publication, Puget Sound's Health. These indicators do not include any measures of nearshore habitat in Puget Sound.</p> <p>The Puget Sound Action Team is assigned (RCW 90.71.060) the responsibility of developing and tracking quantifiable performance measures that can be used to assess the effectiveness over time of programs and actions under the Puget Sound Water Quality Management Plan. The statute specifically calls for methodologies to track the progress of fish and wildlife habitat.</p>
Geographic Scope	Sound-wide, unless the data source that we select is more geographically limited
Subdivisions	Not yet determined
Variables	Not yet determined. Possibilities include: extent of shoreline modification, linear extent of eelgrass cover. Eventually, the indicator could be amended to include/present the results of DNR's eelgrass monitoring.
Data sources	Not yet determined – will not collect data, will use available data.
Products	Puget Sound's Health 2002 (and 2004, 2006, etc.) – a 16-page tabloid-style report with accessible graphics and text. Upwards of 100,000 copies will be produced. Report will be available on Action Team's web site.
Timelines	Select indicator by September 2001. Populate indicator (compile & analyze data; generate graphic) by November 2001. Report indicator in February 2002.
Funding	Base PSAT funding for monitoring and research
Names:	Scott Redman, PSAT

☒ **Type A**
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Other Type:

Title	Fecal monitoring at shellfish growing areas
Brief Description	Marine waters are monitored routinely at shellfish growing areas to ensure that water quality meets standards for commercial harvest of shellfish. The monthly or 6x/year sampling provides data for characterization of status and trends of conditions at commercial shellfish growing areas.
Objectives	Characterize status and trends of conditions in Puget Sound to support evaluation of actions to protect and restore the ecosystem; track changes at individual growing areas and at individual stations within growing areas, to describe environmental responses to pollutions sources and controls.
Geographic Scope	Sound-wide
Subdivisions	Shellfish growing areas (just fewer than 100 in Puget Sound) and monitoring stations
Variables	Fecal coliform bacteria in marine water, measured every month or every two months.
Data sources	Ongoing DOH monitoring. Data record extends back into 1980s for some growing areas/stations.
Products	Annual report with graphic depictions of status and trends for growing areas and individual stations.
Timelines	Sampling occurs monthly or every two months depending on growing area classification. Report is produced annually (in the spring).
Funding	State general fund provisoed for PSAMP
Names:	Tim Determan, DOH

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Other Type:

Title	Limiting Factors Analysis
Brief Description	To identify and rate the habitat factors limiting the production of salmonids in each WR throughout the state. The project is directed by section 10 ESBH 2496, passed in 1996
Objectives	The primary function is to provide a habitat inventory and assessment document that can be used to develop habitat restoration projects.
Geographic Scope	Statewide. The project is applicable to all areas that produce salmonids.
Subdivisions	On a Water Resource Inventory Area basis, and broken down to watershed as necessary.
Variables	Current and historic conditions, if available. May areas lack definitive historic data.
Data sources	
Products	
Timelines	Projected completion 6-30-03
Funding	State general fund approximately 2.0 M per year.
Names:	Ed Manary with the WA Conservation Commission and Conservation Commission Regional Technical Coordinators: John Kerwin, Don Haring, Carol Smith, Carmen Andonaegu, all WDFW employees and Gary Wade and Mike Kuttell Jr. Conservation Commission employees.
	<input checked="" type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Type C <input type="checkbox"/> Type D <input checked="" type="checkbox"/> Type E <input checked="" type="checkbox"/> Type F <input checked="" type="checkbox"/> Type G

Other Type:

Title	Ecoregional planning for the Puget Trough
Brief Description	Conservation Planning for the Willamette Valley, Puget Trough, Georgia Basin Ecoregion
Objectives	Ecoregional planning seeks to identify a network of areas that, if managed appropriately would help insure the long-term persistence of the ecoregion's biodiversity. This planning process considers both species and natural communities, integrates a variety of data sources including contemporary data from more than 100 experts working throughout the ecoregion, and identifies a network of conservation sites that emphasize habitat conservation for multiple species, natural communities, and natural processes.
Geographic Scope	The ecoregional plan includes the Willamette Valley (Oregon), Puget Trough (Washington), and Georgia Basin (British Columbia) The outcomes of this project are applicable soundwide.
Subdivisions	The terrestrial environment has been stratified into four basic units (Willamette Valley, Columbian, Puget Lowlands, and Georgia Basin). The marine environment is divided into two units (marine, estuarine). The freshwater environment has been stratified into ecological drainage units. For site selection the ecoregion is also divided into 9,000(+) hexagons. Hexagons are a very basic geographic unit used in our site selection algorithm. More info on the site selection process could be provided.
Variables	This project goes beyond the marine perspective. The starting point for our work is the selection of conservation targets. These are selected at multiple spatial scales and levels of biological organizations. Targets include freshwater aquatic, terrestrial, and marine species and ecological systems. Criteria for selection include rarity, distribution, endemism, viability, federal, state status, or provincial status. Generally the information deals with current conditions, though a historic perspective is often associated with issues surrounding rarity.
Data sources	Data sources include numerous. Major data partners include WA DNR, WDFW, BC-CDC, BC- LUCO, OR Heritage,
Products	The ultimate goal of the project is to provide a conservation blueprint for the Willamette Valley/Puget Trough/Georgia Basin ecoregion. The exact format of the product has not been finalized. The audience will be for all those interested in conservation. We hope to distribute the information widely.
Timelines	This is an 18(+) month project that was started in early 2000. The plan will be finalized the summer of 2001.
Funding	Private fundraising has been used to support the plan at an estimated cost of \$200,000
Names:	Lead Organization Terry Cook, The Nature Conservancy of Washington Marcy Summers, The Nature Conservancy of Washington Core Team Members Ed Alverson, The Nature Conservancy of Oregon Chris Chappell, WA Department of Nature Resources Mark Goering, The Nature Conservancy of Washington Andrew Harcombe, B.C. Conservation Data Center Cathy Macdonald, The Nature Conservancy of Oregon Dave Rolph, The Nature Conservancy of Washington Chuck Rumsey, The Nature Conservancy of Canada Curtis Tanner, U.S. Fish and Wildlife Service Additionally, we had technical teams whose membership included a wide variety of partners. Technical teams included plants, animals, terrestrial communities, freshwater marine.

Other Type:

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Title	Ass't. of Rocky Reef Fish & Hab. in Skagit Co.
Brief Description	Compile local knowledge bottom fish distribution and public opinion about potential MPA locations. Subsequent work will include in-water data collection
Objectives	Generate maps of bottom fish habitat that will be used in MPA site selection
Geographic Scope	Skagit Co. marine waters
Subdivisions	
Variables	preferred areas for marine protection and preferred areas to be excluded from protection
Data sources	local knowledge of bottom fish resources and other fishing interests
Products	Report with maps of bottomfish habitat for potential protection
Timelines	Phase 1 report complete. Other phases to come.
Funding	Northwest Strait Commission
Names:	Mike Cawrse, Skagit County Public Works

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Other Type:

Title	East Kitsap Strategy for Salmon Recovery
Brief Description	Preparing a strategy document to guide our efforts at identifying and prioritizing salmon recovery projects for funding by the SRF Board and other grant providers.
Objectives	To develop a strategy to direct protection and restoration activities on the East Kitsap Peninsula. Although there are many salmon-bearing streams in E. Kitsap, there are no major rivers. However, we have a very extensive coastline with many small estuaries and this coastline is seen as probably being the most important contribution E. Kitsap makes to regional chinook production. The strategy document will rank streams and coastline areas according to their importance to maintaining healthy, self-sustaining salmon populations. This ranking will be used to guide project sponsors in their selection of projects and to guide the committee as it prioritizes projects for submission to the Salmon Recovery Funding Board. At the moment there are a lot of unknowns about our shorelines and therefore the strategy document will evolve over the course of the next several years as we learn more.
Geographic Scope	East Kitsap Peninsula (the portion that drains to the Sound)
Subdivisions	Individual streams and nearshore segments are ranked according to value to salmon. Within each stream or nearshore segment, a prioritized project list will be developed.
Variables	We will be using recent watershed studies and assessments to rank streams (Kitsap Refugia Study, East WRIA 15 Limiting Factors Analysis, Trust for Public Land Conservation Priorities) as well as local expertise from tribal and other local fisheries groups. Most of the material in the studies address streams rather than nearshore. For nearshore information we will be using local inventories of bulkheads, docks and natural resources as well as local biologists and state databases including baitfish spawning beaches and the DNR Shorezone Inventory (eelgrass and protist populations, substrates, etc). This information will allow an initial coarse attempt at prioritizing nearshore areas and will allow us to identify data gaps and develop assessment proposals to fill the gaps. The strategy document will evolve over time as we learn more about our salmon habitat.
Data sources	Kitsap Peninsula Salmonid Refugia Study, Limiting Factors Analysis (East WRIA 15), DNR Shorezone Inventory, Local (county and tribal) inventories of natural resources and human-made structures, state biologists who monitor local shorelines and permit/regulate activities on the shoreline.
Products	The Strategy document will include an introduction specifying the group vision and objectives and discussing data gaps and other important issues to be considered. There will be a table that ranks each stream in tiers according to its local importance to salmon recovery. Following that will be a prioritized list of projects for each stream or nearshore segment. Most of this latter part has been accomplished already in the Limiting Factors Analysis, however there may be some revisions and that report does not contain much nearshore project information. We will need to develop a way to identify and prioritize the needed projects in the nearshore. The strategy will be used by the committee to guide its prioritizing and funding decisions and to allow it to identify sponsors for important projects. It will also be used by project sponsors throughout the area to guide them in selection of projects.
Timelines	We just started and hope to have a draft document ready by July 1 when the next SRF funding round begins.
Funding	All committee members are volunteers. Staff facilitator funded through a SRFB Lead Entity grant. Any other incurred expenses are paid through this grant also.
Names:	East Kitsap Salmon Habitat Restoration Committee: composed of 15 citizens appointed by the county commissioners. Roger Fuller - Staff facilitator (Kitsap County Habitat Biologist) Paul Austin - Kiwanis Salmon in the Classroom program Mary Bertrand - Chums of Barker Creek (community stream restoration and advocacy team) Ray Frederick - Kitsap Poggie Club, formerly with Mid Sound Fisheries Enhancement Group Roy Huberd - Pierce County Water Program

Diane Jones - commercial fisher, Chums of Barker Creek
 Steven Jonn - Chums of Barker Creek, Kitsap Stream Team
 Fred Karakas - streamside property owner
 Irwin Krigsman - Kitsap Salmon Advisory Committee, Stream Team
 Tom Masters - USN engineer (PSNS)
 Al Miller - Trout Unlimited, Mid Sound Fisheries Enhancement Group
 Jack Minert - Hood Canal Coordinating Council, Cutthroats of Carpenter Creek
 (community stream group)
 Joleen Palmer - Stillwaters Environmental Education, Cutthroats of Carpenter Creek
 Daryl Schruyl - Chums of Barker Creek, Central Kitsap Community Council
 Herb Shinn - Clear Creek Council, Kiwanis Salmon in the Classroom Program
 Ken Widell - Streamside property owner

Other Type:

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Identifying data gaps

Title	Volunteer Monitoring of Salmon Habitat (Duwamish)
Brief Description	Volunteer monitoring of vegetation and bird use at Duwamish Estuary restoration projects.
Objectives	Measure the effects of upland restoration at 10 Duwamish River project sites.
Geographic Scope	Duwamish Estuary
Subdivisions	Individual project locations
Variables	Birds: species counts; numbers; frequency of observations; length of use; shorebird use of mudflats, embayment use by waterfowl and marine birds, upland and estuarine habitat use for nesting & migration; nesting success of purple martins, spotted sandpipers, osprey, rails, song sparrow
Data sources	Data being collected by volunteers monitoring of vegetation at and bird use of restoration sites
Products	
Timelines	
Funding	PIE contract assisted with development of protocol
Names:	Jacques White, People for Puget Sound
Other Type:	<input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B <input type="checkbox"/> Type C <input type="checkbox"/> Type D <input type="checkbox"/> Type E <input checked="" type="checkbox"/> Type F <input checked="" type="checkbox"/> Type G X Monitor effectiveness of restoration

Title	Dungeness Sediment Reduction
Brief Description	A major investigation of the lower Dungeness River and bay is underway. One of the grant sources for the Tribe's coordination and hiring of other agencies, contractors is a state Centennial Clean Water Grant. The title for that project is: "Dungeness Sediment Reduction for Fish/Shellfish Project". The other investigations on the lower river each have their own titles (see reports in #8).
Objectives	<p>From the original grant the objectives were to "Analyze water quality in the Dungeness River and Dungeness Bay, investigating 1) the relationships between in-river and temperature pollution and salmon limiting factors, and 2) increased sedimentation in the Bay and its possible relationship to increased fecal coliform and other pollution in Dungeness Bay impacting shellfish."</p> <p>In the Dungeness Bay: Water quality and circulation studies were triggered by a Shellfish Downgrade under the National Shellfish Sanitation Program when closed to shellfish harvesting in 2000, and currently a TMDL process is occurring, with a new Clean Water District having just been declared in Clallam County, as a result.</p> <p>In the River: The WRIA 18 Limiting Factors Report and the Dungeness habitat plan (Recommended Restoration Projects for the Dungeness River, Dungeness River Restoration Work Group, 1997), describe sediment recruitment, build-up and transport as a concern, along with the absence of stable mainstem spawning habitat as a limiting factor. A geomorphology study is underway related to the impacts on salmon habitat of a lower river ACOE dike, and diking in the Dungeness estuary. A multi-agency planning and acquisition effort is also underway with the intent to eventually restore the estuary and set back the dike, and restore the floodplain in the lower 2-3 miles of the Dungeness.</p> <p>The Hydrogeologic study had the objectives to define and assess the present geomorphic and hydrologic processes in the lower 10 miles of the Dungeness River.</p>
Geographic Scope	WRIA 18, Dungeness River and Bay (Strait of Juan de Fuca), Puget Sound
Subdivisions	<p>The Dungeness Bay circulation study, water column sampling and bathymetric mapping, as well as the in-river USGS/BOR sediment transport study results and methods are applicable elsewhere. The Bay study emanated from the need to understand what non-point pollution sources were adding to increased levels of fecal coliform, including human and non-human impacts. The methods and results developed and used by USGS/BOR will be applicable in other areas of the country.</p> <p>In the Bay: the circulation and other studies took place in the inner Dungeness Bay because of the spit formations and apparent circulation patterns within and without the bay, and because of the varied opinions about what the causes of increased fecal coliform appeared to be.</p> <p>In the River: The Dungeness River has always been divided by investigators as the lower river (below RM 11) and the upper river (upstream from RM 11), because of both physical conditions and ownership (upper watershed has forest and park designations). The river studies took place in the lower 10 miles of the river, primarily with two automatic sediment samplers installed at the USGS gage at RM 11.8 and near the mouth of the river at the Schoolhouse Bridge (approx. RM 1), and with temp. gages throughout. The Bureau of Reclamation also placed and studies cross-sections, and scour-chains (Tribe) throughout the lower 11 miles of river for the geomorphology study.</p>
Variables	<p>In the Bay: Circulation study: water circulation patterns, residence times, tidal excursion and extent of oceanic and riverine mixing; Water column sampling: estimate population of birds and seals in the bay, determine from literature and measurements the contributions of fecal coliform bacteria from birds and seals; determine washout and die off of fecal coliform within the bay, and determine if resuspension of sediment and associated viable fecal coliform are contributing to the failure of water quality standards. Bathymetric mapping: verify and update existing bathymetric maps of Dungeness Bay and mouth of Dungeness River.</p> <p>In the River: instream flows (before any diversions) RM 11.8 and (after diversions) RM 1, temperatures (16 sites lower 10 miles of river and at RM 11.8 and RM 1), suspended sediment and bedloads at RM 11.8 and RM 1 and throughout at cross-section/scour chains sites.</p>

Data sources	<p>Historic river data is being referred to as far back as possible, with earlier maps/charts giving information from the late 1800's and early 1900's.</p> <p>The Tribe, County, State, USGS, BOR developed all current data throughout the project, or hired investigators to find the information, except for historical river flow data from USGS gages (nearly 90 years of records). Old maps, charts and surveyors records, along with river flow data for historic information were used, and new data were developed through the various study methods.</p>
Products	<p>In the Bay: a report (including modeling) is about to be completed with the data described in #7. Various presentations of preliminary data have been given to the public at the Dungeness River Management Team (DRMT) meetings and at agency meetings and when the final report is completed the researchers will again present their information. The information will be distributed to the Tribe and to all the state (Ecology DOH) and local agencies (County, cities) involved in the project, and will also be available on a web page, either at Clallam County or the Tribe (DRMT webpage).</p> <p>In the River: the data collected by the USGS was published in the Water Resources Data Washington Water Year 1999 Report, and has been made available to Clallam County, the Tribe, the Army Corp. of Engineers and the Bureau of Reclamation (all involved in a study related to setting back a large lower river dike and restoration of the floodplain and estuary). The BOR has completed reports on the "Geomorphology of the Lower Dungeness River Report" (draft, final due this summer), the "Schoolhouse Bridge Analysis, Dungeness River, Washington State" and a "Comparison of 1930's and Existing Conditions and Analysis of Alternatives for Levee Modifications Along the Dungeness River in the Lower 2.7 River Miles". This includes reports and extensive GIS mapping (map of river corridor delineating stratigraphic units and historical modification using aerial photographs and historical accounts of development), rectified aerial photographs (2' contours), along with numerical modeling of river hydraulics from surveyed cross-sections data.</p>
Timelines	<p>This project started being implemented in 1998 for the sediment/bedload and temperature data. The BOR Geomorphology Study final is due this summer 2001. The circulation/bay studies started in 1999; the data has been collected and the final report is due this summer 2001.</p>
Funding	<p>Bay Studies and River Temperature work:*</p> <p>\$250,000 total grant project costs: , \$187,500 Dept. of Ecology (Centennial Clean Water Grant Fund) \$62,500 Inkind (USGS cost share).</p> <p>Lower river dike/estuary restoration studies-Bureau of Reclamation estimated to be:*</p> <p>1997-1998: \$150,000 1999-2001: \$150,000</p> <p>*These amounts do not include considerable costs for the Tribe, and other local or state agencies involved in the joint efforts.</p>
Names:	<p>Jamestown S'Klallam Tribe-primary contacts are (river work)Linda Newberry, Jamestown S'Klallam Tribe (360) 681-4601, lnewberry@jamestowntribe.org, , and (bay work) Lyn Muench, Jamestown S'Klallam Tribe, (360) 681-4631, lmuench@jamestowntribe.org.</p> <p>Other contractors/partners include Clallam County, the State (Ecology, DOH), the USGS and BOR and individual consultants.</p>
Other Type:	<p> <input type="checkbox"/> Type A <input checked="" type="checkbox"/> Type B <input type="checkbox"/> Type C <input type="checkbox"/> Type D <input type="checkbox"/> Type E <input type="checkbox"/> Type F <input checked="" type="checkbox"/> Type G </p>

Title	Puget Sound Technical Recovery Team (TRT)
Brief Description	Our charge is to develop delisting criteria for populations and ESUs of (1) Puget Sound chinook, (2) Hood Canal summer chum, and (3) Lake Ozette sockeye. Delisting criteria will consist of necessary abundance, productivity, spatial distribution and diversity of fish in each population within the ESU. The TRT also is expected to provide technical guidance to watershed and other planning groups in prioritizing among actions for recovery within their planning areas.
Objectives	The primary TRT tasks are to: Identify population/ESU delisting criteria, Characterize habitat/fish productivity relationship, Identify factors for decline and limiting factors, Identify early action for recovery, Identify research, monitoring, and evaluation needs, Serve as science advisors to groups charged with developing measures to achieve recovery goals.
Geographic Scope	The waters within the Puget Sound chinook, Hood Canal summer chum and Lake Ozette sockeye ESUs.
Subdivisions	The team is defining demographically independent populations of chinook (and will do so for summer chum and sockeye). WRIAs tend to have 1-3 populations within them.
Variables	abundance, productivity, habitat, capacity, diversity, spatial distribution of fish, current and historic estimates (late 1800s) where possible
Data sources	Co-managers, watershed groups, etc. provide data that the TRT assembles and then produces further analyses/syntheses.
Products	1. Identify populations: Feb-Mar 2001 2. Characterize populations: Apr 2001 3. Estimate viability of populations: Jun 2001 4. Provide scenarios of ESU viability: summer-fall 2001 5. Identify factors limiting recovery: Summer-fall 2001
Timelines	(See products above). Population identification document will be out for public review in early Apr 2001.
Funding	NMFS. No idea of projected cost
Names:	Mary Ruckelshaus, Norma Sands, NMFS; Ken Currens, NWIFC; Jim Doyle, Mt. Baker-Snoqualmie Natl Forest; Bob Fuerstenbert, King Co; Bill Graeber, WDNr; Kit Rawson, Tulalip Tribes; Jim Scott, WDFW
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Other Type:	

Title	Development of matrices for PFCs
Brief Description	Develop matrices of pathways and indicators for the marine environment.
Objectives	The different agencies are involved in this project for varying reasons. In general, the objective is to define properly functioning conditions for the marine environment, including estuaries, nearshore habitats, and deep water. The goals vary slightly between agencies. For NMFS, the goal is to develop a tool that can be used for Section 7 consultations under the ESA. For WDNR, WDFW, and PSWQAT, the goal is broader, to develop a tool that can be used to protect the marine environment in general, with an emphasis on salmon.
Geographic Scope	We hope that these matrices can be used by agencies and project proponents in all coastal areas of Washington, including Puget Sound and the Columbia River estuary.
Subdivisions	Since we are attempting to describe properly functioning conditions, we are not actually engaged in a study. However, for the purposes of our project, we have divided the marine environment into 3 habitat types: 1) river mouth estuaries; 2) nearshore marine habitats (<20 m MLLW); and 3) Deepwater habitats (>20m MLLW).
Variables	We are addressing a wide range of variables that can be used as indicators of properly functioning conditions. They include physical parameters (energy regimes, sediment quality/quantity, water quality/quantity, etc.) and biological parameters (community composition, species diversity, etc.) and includes comparisons of historical and current conditions for many of these parameters. These variables are, at the present, preliminary, and will require additional time before they become finalized. The historical comparisons of these indicators depends on a variety of factors, including the indicator being compared, the location and scope of the analysis, and the availability of historical data. Therefore, it is impossible to state the time frame of such historical analysis.
Data sources	
Products	We hope that the matrices will provide a tool that can be used by state and federal agencies, as well as project proponents, to assess the impacts that a project has on the overall health of the marine ecosystem. We anticipate that they will be made available to the public.
Timelines	This project was begun in October, 2000 at a workshop convened by the Washington Department of Fish and Wildlife. Since that time, we have developed a list of the pathways and indicators that we intend to submit to review within our respective agencies in the very near future. Once that review is completed, we plan to distribute it more widely for review by other federal and state agencies, as well as Tribal associations and the public. The timeline for completion is not known at this time.
Funding	This project is being conducted by the participants as part of their regular employment with the participating agencies. Therefore, there is no budget or projected costs available.
Names:	John Stadler, Robert Donnelly, Cathy Tortorici, NMFS; Bill Graeber, WDNR, Joe Jauquet, WDFW; Jo Henry, PSAT
Other Type:	<input type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Type C <input checked="" type="checkbox"/> Type D <input type="checkbox"/> Type E <input type="checkbox"/> Type F <input type="checkbox"/> Type G

also includes the deeper marine water, >20m

Title	SRFB FORAGE FISH PROJECTS COORDINATOR
Brief Description	Include Type H Project Description Below: Yielding consistent deliverables, regional maps & databases, uniformly achieved final results. This will enable new counties to join project in future years.
Objectives	To enable eight individually-proposed & funded forage fish (FF) habitat projects, funded by three unrelated entities, to be undertaken in four North Sound counties, to cooperatively produce seamless, regional, science-based results. Drivers: employing the same protocols, with uniform QA/QC, will produce data from all projects that will be usable everywhere, rendering these potentially random efforts into a valid, regional project.
Geographic Scope	Island, Jefferson, Clallam & San Juan Counties.....entire shorelines.
Subdivisions	n/a (see individual FF project survey results)
Variables	n/a (see individual FF project survey results)
Data sources	All data will be newly collected. Actual inspection and collection regimen by marine biologists and trained volunteers using Moulton/Penttila Forage Fish Assessment Protocol, 2000 (San Juan County Marine Resources Committee.) Lab reports of ID protocols (same).
Products	By Coordinator: meeting & training protocols; reports to funders, consistent deliverables based upon agreed QA/QC protocols, regional conclusions and maps, uniform website. All results to be released & reported widely for use by agencies, planners, shoreline residents, and future project sponsors. By local projects: Samples, training materials, field notes, lab reports, photographs, GPS notations, site database (Per Slocomb), maps, website database
Timelines	April, 2001 to May, 2002 (13 months)
Funding	Salmon Recovery Funding Board Grant \$28,000 (subsequent years' coordination will depend upon number of projects in need of participation & available funding.) Salmon Recovery Funding Board Grant \$28,000 (subsequent years' coordination will depend upon number of projects in need of participation & available funding.) Salmon Recovery Funding Board Grant \$28,000 (subsequent years' coordination will depend upon number of projects in need of participation & available funding.)
Names:	Forage Fish Projects Coordinator- Gary Wood Gary Wood J.D., Principal INTERTIDAL CONSULTING 2629 North West Beach Road Oak Harbor, WA 98277 (360) 279-9612 gwood@whidbey.net Project sponsor: Island County Marine Resources Committee (MRC) c/o WSU Cooperative Extension PO Box 5000 Coupeville, WA 98239 MRC Fiscal Officer and County Lead - Don Meehan (360) 679-7327 phone or fax or meehan@wsu.edu MRC CHAIR, Tom Campbell (360) 341-6387 audubon@mail.whidbey.com Dan Penttila, WDFW Coordinated Projects lead marine biologist
Other Type:	<input type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Type C <input type="checkbox"/> Type D <input type="checkbox"/> Type E <input checked="" type="checkbox"/> Type F <input checked="" type="checkbox"/> Type G X Provide consistency among projects

Title	EDT/Marine
Brief Description	
Objectives	
Geographic Scope	
Subdivisions	
Variables	
Data sources	
Products	
Timelines	
Funding	
Names:	Lars Mobrand

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